COMMONWEALTH BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 31] March, 1961 [No. 3

DISEASES CAUSED BY BACTERIA AND FUNGI

Verge, J., Goret, P., Joubert, L., Paraf, A. & Asso, J. (1960). Contribution à l'étude des staphylocoques d'origine animale. Caractères et identification. **[Characters and identification of staphylococci of animal origin.]** — Rec. Méd. vét. **136**, 527-555. [Summaries in English and Spanish.] **603**

Staphylococci isolated from animals can be divided into 3 groups: those of animal origin; saprophytes; and those due to human contamination. Staphylococci of animal origin are identifiable by absence of fibrolysin, presence of both α and β haemolysins, absence of agglutination by the sera of Cowan and Oeding, weak sensitivity to phages of human origin, and strong sensitivity to phages of homologous origin. Saprophytes can be identified by means of phages. Staphylococci of human origin possess fibrolysin and a haemolysin, are agglutinated by the sera of Cowan and Oeding, and are highly sensitive to phages of human origin.—M.G.G.

Boger, W. P., Frankel, J. W. & Gavin, J. J. (1960). **Detection and titration of Staphylococcus aureus agglutinin in serum.** — Proc. Soc. exp. Biol., N.Y. **104**, 639-642. [Authors' summary modified.] **604**

A simple agglutination test for detection and titration of an unidentified anti-staphylococcal factor in human and animal sera is described. By this test variable titres have been found to occur naturally in sera of animals and of man. Agglutinins were present in large amount in pooled human gamma globulin and in insignificant amount in a single agammaglobulinaemic serum. Titres of this factor can be increased by treatment of both animals and man with a staphylococcal vaccine. It was present in the antibody bearing fraction of blood, was heat stable and could be adsorbed semi-quantitatively with coagulase-positive staphylococci and was therefore presumed to be an antibodv.

Richou, R., Quinchon, C. & Richou, R. (Mme) (1960). Sur la présence, dans les sérums sanguins humains et animaux, de principes capables de neutraliser certaines propriétés enzymatiques des toxines staphylococciques. **[Neutralization of enzymes in staphylococcal toxins by human and animal sera.]** — Rev. Immunol. **24**, 505-511. **605**

The action of staphylococcal toxin on egg yolk was neutralized by 12 of 18 bovine sera and 11 of 31 human sera; lipase activity by one of 18 bovine sera and 3 of 33 human sera; and lecithinase activity by 3 of 18 bovine sera and 3 of 15 human sera. Sera from horses, sheep and rabbits had no such effect. Practically all sera, on the other hand, neutralized the caseolytic activity of staphylococcal toxin. The neutralizing power appeared to be an inherent property of serum.—M.G.G.

Fisher, S. (1960). **The antistaphylococcal activity of human sera in vitro and its relationship to passive protective potency.**—Aust. J. exp. Biol. med. Sci. **38**, 339-346. [Author's summary modified.] **606**

The degree of bactericidal or bacteriostatic effect of human sera against coagulase producing staphylococci varied according to strain and serum. The nature of the antibacterial agent is unknown.

The ability of human sera to protect mice against the lethal effect of intraperitoneally injected living staphylococci of a certain strain (strain Smith) in mucin suspension appeared independent of the effect of the sera against the same strain *in vitro*.

In a preparation of human gamma globulin, the mouse protective factor appeared to have been concentrated; divergent results

were obtained in two kinds of test for antibacterial activity *in vitro*.

Blobel, H. & Berman, D. T. (1960). **Serologic studies of purified staphylococcal coagulase with special reference to fluorescence microscopy.**—J. Immunol. **85,** 244-249. [Authors' summary modified.] **607**

Rhodamine isothiocyanate-labelled antibody prepared against electrophoretically purified coagulase was employed after absorption with a coagulase-negative strain of staphylococcus, to differentiate between coagulase-positive (including 19 bovine mastitis strains) and coagulase-negative staphylococci. By application of this reagent, a close association between coagulase production and the staining reaction was observed, but absolute specificity could not be established. Some relationship between the bacteriophage group of staphylococcal strains and the antigenic specificity of free coagulase produced by the corresponding strains was observed in cross-inhibition experiments. Double diffusion precipitin analysis revealed heterogeneity of the antiserum prepared against highly purified coagulase.

Ekstedt, R. D. & Yotis, W. W. (1960). **Studies on staphylococci. II. Effect of coagulase on the virulence of coagulase negative strains.**—J. Bact. **80,** 496-500. [Authors' summary modified.] **608**

Coagulase-negative haemolytic strains of *Staph. aureus* suspended in solutions of partially purified coagulase and injected intracerebrally into mice killed many of them. Organisms alone or coagulase alone were innocuous.

Such virulence enhancement could not be demonstrated if the coagulase was given intravenously followed by intracerebral challenge, nor was coagulase able to enhance the virulence of streptococci. Coagulase adsorbed onto coagulase-negative staphylococci may protect them from the natural defence mechanisms of the host.

Lehnert, C. (1960). Über einen Rinderabort durch Bac. anthracis. **[Anthrax bacilli in an aborted calf foetus.]** — Zuchthyg. Fortpfl-Störung. u. Besamung **4,** 208-209. [Summaries in English and Russian.] **609**

Anthrax bacilli were isolated from a foetus aborted in the 7th month by an apparently healthy heifer 2½ years old. Serological examination of the heifer 3½ months later revealed precipitins against *Bacillus anthracis*. Anthrax had not been reported in the district for years, and no further case occurred.—M.G.G.

Szent-Iványi, T. (1960). **Studies on the immunizing properties of non-encapsulated strains of Bacillus anthracis.** — Acta vet. Acad. Sci. hung. **10,** 239-246. [In English.] **610**

Eight sheep inoculated with 2 ml. of vaccine containing 10 million spores of non-capsulated *B. anthracis* adsorbed to aluminium hydroxide gel were immune to s/c challenge with a mixture of 2 virulent strains of *B. anthracis* 6½ months later.—M.G.G.

Biondi, E. (1960). Ricerche sull'associazione jaluronidasi-siero anti-B. anthracis. **[Treatment of anthrax with hyaluronidase and immune serum.]** — Zooprofilassi **15,** 37-41. **611**

In experiments on g.pigs hyaluronidase did not enhance the activity of *B. anthracis* immune serum.—T.E.G.R.

Anon. (1960). **The tuberculin test.**—Brit. vet. J. **116,** 368-372. **612**

In the early years of this century, in Gt. Britain, Old Tuberculin (OT) by the subcutaneous route was used to detect tuberculous cattle, but by 1930 this had been replaced by the double intradermal technique with measurement of a skin fold in the middle third of the neck. To increase selectivity, Heat Concentrated Synthetic Medium (HCSM) tuberculin was substituted for OT but reactivity still frequently occurred in non-affected animals. In 1943, Avian and Mammalian Purified Protein Derivative (PPD) tuberculins were introduced in a comparative intradermal test still using the double injection. In 1947, to reduce the number of visits required, a comparative intradermal test involving injection only once of each tuberculin was introduced, the technique and interpretation of which is described. Whilst still not necessarily specific for individual cows, this is a very useful herd test.

—A. Ackroyd.

Nassal, J. (1960). Die Klärung positiver und zweifelhafter Tuberkulinreaktionen beim Rind mit dem Simultantest unter Anwendung eines vereinfachten Beurteilungsschlüssels. **[Differentiation of reactions in cattle to the comparative tuberculin test, using a simplified evaluation key.]** — Rindertuberk. u. Brucellose **9,** 91-102. **613**

A key for interpreting reactions in

the comparative tuberculin test was described. A skin reaction greater by at least 3 mm. to bovine than to avian tuberculin indicates infection with the bovine type. A skin reaction greater to bovine tuberculin by up to 1·5 mm., or smaller to bovine than to avian tuberculin, indicates infection with other mycobacteria, especially the avian type. A skin reaction 1·6–2·9 mm. greater to bovine than to avian tuberculin is doubtful, but can be resolved by comparing the reactions of the whole herd. The key was determined from tuberculin reactions and bacteriological findings in 279 cattle. It was correct in 91% of cattle infected with the bovine type, 92% of cattle with the avian type, and 62% of cattle with the human type.—M.G.G.

Schaaf, J. & Beerwerth, W. (1960). Die Geflügeltuberkulose des Rindes, ihre Organlokalisation und ihre Bedeutung als Ursache unspezifischer Tuberkulinreaktionen. [**Avian-type tuberculosis in cattle. Localization in organs and its importance as a cause of non-specific tuberculin reactions.**]—Rindertuberk. u. Brucellose **9**, 59-70. **614**

Tubercle bacilli of the avian type were demonstrated, by culture and animal inoculation, in 64 of 1,086 non-specific reactors. No P.M. lesions were found in 35 of these 64 cattle. The organism was isolated from the digestive system in 41, the respiratory system in 8, both respiratory and digestive systems in 2, the skin in 4, a cervical lymph node in one, and the kidney of a foetus. Of 8 with generalized TB., one had acute miliary TB. and another acute progressive pneumonia. In the comparative tuberculin test in 27 reactors, 9 were positive and 13 doubtful to bovine tuberculin, and 23 positive and 4 doubtful to avian tuberculin.—M.G.G.

Stöckl, W. & Mathois, H. (1960). Über die spezifische Wirksamkeit von Tuberkulinfraktionen. I. Mitteilung: Untersuchungen an Meerschweinchen. [**Specificity of tuberculin fractions. I. In guinea-pigs.**] — Wien. tierärztl. Mschr. **47**, 683-688. [Summaries in English, French and Italian.] **615**

Two fractions were extracted from heated culture filtrates of tubercle bacilli of human and bovine types and other mycobacteria, by treatment first with acetic acid, and secondly with trichloracetic acid. The second fraction gave strong, usually specific reactions in tuberculin tests in sensitized g.pigs.—M.G.G.

Thiel, W. (1960). Prüfung des Desinfektionsmittels "Tego-51" zur Grob- und Stalldesinfektion gegenüber Tuberkelbakterien. [**Tests with "Tego-51" for disinfection of premises infected with tubercle bacilli.**]—Rindertuberk. u. Brucellose **9**, 142-148. **616**

Sand, wood shavings, sawdust, chalk, tiles and razor blades contaminated with milk containing tubercle bacilli were sprayed with 3% formol or different dilutions of "Tego-51", a disinfectant containing the amino-acid, di(octylaminoethyl) glycine. At 5% it killed the bacilli in 3–12 hours, and was as effective as 3% formol.—M.G.G.

Vicard, A. (1960). Résultats obtenus dans la tuberculose bovine avec un antibiotique extrait d'un aspergillus. [**Treatment of bovine tuberculosis with antibiotic extract of an Aspergillus.**]—Bull. Acad. vét. Fr. **33**, 423-424. **617**

A brief preliminary account of the use of an antibiotic extracted from an aspergillus [? *A. fumigatus*] for the treatment of TB. in cattle. The antibiotic was injected twice weekly for 5 weeks into 73 cattle positive to the tuberculin test. After an interval of 3 weeks 51 were negative and 12 doubtful to the test. The negative animals appeared to be resistant to further infection in a contaminated environment.—M.G.G.

Wilson, J. E. (1960). **Avian tuberculosis. An account of the disease in poultry, captive birds and wild birds.**—Brit. vet. J. **116**, 380-393. **618**

TB. in fowls was first described by Crisp in 1868 and in Scotland was first recorded in 1888. After the development of specialized poultry farms, avian TB. was found in 14% of all specimens sent for autopsy, but, with the increased use of intensive methods, the incidence has now dropped to 0·4% in specimens from accredited farms and 1·8–2·1% in those from non-designated farms. Because of the chronic insidious nature of the disease, it is often well established in a flock before symptoms are noted. In turkeys, outbreaks are rare, but once introduced the disease may persist in a flock for years; it is relatively rare in ducks and geese. Amongst birds in captivity, it is a common cause of death, and it has been found in numerous varieties of wild birds. This is probably the result of prior contact with diseased poultry as there are no indications at present that wild birds are likely to provide a permanent reservoir of infection.—A. Ackroyd.

Fomina, A. Y., Kontrimavichus, L. M. & Prokhorov, A. V. (1960). **[Technique of preparing antigen for the agglutination test for tuberculosis in fowls.]** — Veterinariya, Moscow No. 6 pp. 30-31. [In Russian.] **619**

The method described by Prokhorov [*V.B.* **29,** 1293] was improved by using a shaking machine to obtain homogeneous suspensions; spontaneous agglutination of antigen was avoided by washing cultures grown on Pavlov's medium for 30 days.
—R.M.

Tesink, J., Robijns, K. G. & Jobse, A. S. (1960). Het aantonen van in faeces en bodem voorkomende aviaire tuberkelbacteriën door middel van intraperitoneale injectie bij kippen. **[Demonstration of avian tubercle bacilli in faeces and soil by means of intraperitoneal injection into chicks.]**—Tijdschr. Diergeneesk. **85,** 1214-1221. [In Dutch. Summaries in English, French and German.] **620**

Faeces were collected from a cow during 3 days after oral administration of avian bacilli. About 250 g. faeces from each sample were moistened with normal saline and strained twice through double gauze. The filtrate was centrifuged for 30 min. at 3,000 r.p.m. and the sediment was washed once with saline before being inoculated i/p in a dose of 2 ml. a chick. The chicks were killed after two months (except for one that died from intraperitoneal abscess after 24 days). Avian bacilli were isolated from chicks inoculated with faeces collected 1, 2 and 3 days after infection. On the third day after infection the cow gave a non-specific reaction to the tuberculin test.

Soil from a pen that had housed tuberculous fowls for over a year was examined by a similar method and avian bacilli were recovered from all four chicks inoculated.
—R.M.

Fouquet, G. & Delauney, G. (1960). Phosphore et entérite paratuberculeuse. **[Phosphorus and Johne's disease.]** — Rec. Méd. vét. **136,** 467-475. [Summaries in English and Spanish.] **621**

In an investigation of Johne's disease in the Eure Department during the first half of 1958 it was observed that recrudescence was associated with poor quality winter rations. The disease had a regional distribution and rarely affected lactating cows on a balanced supplemented diet but decimated young animals and those permanently at pasture. Analysis of the soil and hay revealed phosphorus deficiency and a high Ca : P ratio. Good results were achieved by adding P supplements to the diet and treating pastures with P. It is claimed that i/v inj. of phosphoric esters gave good results.—T.E.G.R.

Larsen, A. B. & Vardaman, T. H. (1960). **Allergy studies on cattle vaccinated with killed Mycobacterium paratuberculosis.** — Amer. J. vet. Res. **21,** 744-747. **622**

Fifteen calves inoculated i/d with 0·1 or 0·3 ml. of killed *M. johnei* developed larger reactions to johnin than to tuberculin in the caudal fold and cervical region in 160 out of 204 tests. After 20 months, 8 no longer reacted to tuberculin. Degree and period of sensitivity were not affected by the size of the dose of killed *M. johnei* nor by removal of the vaccination nodule. Of 6 animals inoculated s/c with killed bovine tubercle bacilli 22 months after the killed *M. johnei,* 3 had larger reactions to tuberculin than to johnin in the caudal fold and 5 reacted more strongly to tuberculin than to johnin in the cervical region; in the others the reactions were of equal size.—M.G.G.

Kujumgiev, I. (1960). Sulla sopravvivenza del Mycobacterium paratuberculosis johnei su terreni colturali solidi e sua crescita su terreni contenenti vitamina K. **[Survival of Mycobacterium johnei on solid media and growth on media containing vitamin K.]** — Zooprofilassi **15,** 31-32. **623**

On the solid medium described by Rinjard, *M. johnei* survived for over 3 years. Good growth was obtained on the solid medium described by Finlayson for *M. tuberculosis,* with vitamin K substituting the *M. phlei* extract.—T.E.G.R.

Goerttler, V. (1960). Probleme der Rotlaufforschung. **[Swine erysipelas research problems, including the impossibility of eradication.]**—Dtsch. tierärztl. Wschr. **67,** 285-288. [Summary in English.] **624**

In this review of the problems of the epidemiology and pathology of swine erysipelas, G. stated that the disease cannot be eradicated, as the agent is ubiquitous. [But see *V.B.* **31,** 27.].—M.G.G.

Bosgra, O. & Wilson, J. H. G. (1960). Praktijkproeven met levend avirulent vlekziektevaccin, in verband met het optreden van entreacties. **[Trial of living avirulent erysipelas vaccine with reference to inoculation reactions.]**—Tijdschr. Diergeneesk. **85,**

1283-1289. [In Dutch. Summary in English.] **625**

A disadvantage of Staub's vaccine—its relatively short storage life—was overcome by freeze-drying it. Three freeze-dried vaccines were tried on two thousand pigs in doses of two or ten million organisms per pig. Reaction to inoculation, defined as any deviation from normal health within 14 days after inoculation, occurred in 4·6% of the pigs: in most cases it took the form of reduced appetite, sluggishness and sometimes skin rash lasting for 2 days. Presence or absence of agar in diluent for the vaccine appeared to have no influence on the incidence of reactions. Heavier pigs (over 50 kg.) reacted more often than lighter pigs. None of the 2,000 contracted erysipelas within 8 months after inoculation.—R.M.

Scholz, H.-D. (1960). Über den Nachweis von Listerien bei zwei Schlachtrindern im Verlaufe der bakteriologischen Fleischuntersuchung. **[Isolation of listeria from two slaughtered cattle.]** — Berl. Münch. tierärztl. Wschr. **73,** 381-384. **626**

L. monocytogenes was isolated during routine bacteriological meat inspection from two slaughtered cattle, in one from the organs, lymph nodes and muscle, and in the other from the liver and an iliac lymph node. —M.G.G.

Welshimer, H. J. (1960). **Survival of Listeria monocytogenes in soil.** — J. Bact. **80,** 316-320. **627**

W. found that *Erysipelothrix monocytogenes* could survive in sterilized soil samples under certain experimental conditions for as long as 295 days. He considers it possible that the soil may serve as a reservoir of infection but he apparently did not study the survival of the organism in unsterilized soil.

Neter, E., Anzai, H. & Gorzynski, E. A. (1960). **Identification of an antigen common to Listeria monocytogenes and other bacteria.** —Proc. Soc. exp. Biol., N.Y. **105,** 131-134. [Authors' summary modified.] **628**

L. monocytogenes (types 1, 2, 3, 4a, and 4b) produces a heterogenetic antigen demonstrable by haemagglutination test with suitable antisera. Sheep erythrocytes modified by this antigen are lysed in presence of (rabbit) antiserum and g.pig complement. Antibodies against this antigen are present in certain *L. monocytogenes* and *Staph. aureus* (rabbit) antisera and can be removed by absorption with either *L. monocytogenes* (of all types), *Staph. aureus,* or *B. subtilis.* The findings may help to avoid a possible pitfall in interpretation of serological tests for species-specific *L. monocytogenes* antibodies.

Kolb, E. & Seidel, H. (1960). Ein Beitrag zur Kenntnis des Stoffwechsels von Listeria monocytogenes (Typ 1) unter besonderer Berücksichtigung der Oxydation von Kohlenhydraten und Metaboliten des Tricarbonsäurecyclus und deren Beeinflussing durch Hemmstoffe. **[Metabolism of E. monocytogenes with reference to carbohydrates and the tricarboxylic acid cycle.]**—Zbl. VetMed. **7,** 509-518. [Summaries in English, French and Spanish.] **629**

The basic respiration of *E. monocytogenes* was increased most by glucose, followed by lactose, fructose, maltose and saccharose. Arabinose, mannite and sorbite had little or no effect. Respiration was stimulated strongly by malic acid, pyruvic acid and alpha-ketoglutaric acid. Penicillin and tetracycline inhibited respiration better than the sulphonamide "Salthion" and streptomycin.—M.G.G.

Bain, R. V. S. (1960). **Mechanism of immunity in haemorrhagic septicaemia.**—Nature, Lond. **186,** 734-735. **630**

Serum from buffaloes and cattle immune to haemorrhagic septicaemia possessed both opsonins and bactericidal properties. Cultured pasteurella could not be used to detect bactericidal substances in serum. Bactericidal effect was measured by the ability of 1 ml. fresh serum in 10 ml. of broth to prolong the lag phase of pasteurella organisms introduced in 0·01 ml. of serum from an infected animal. Cultured pasteurella contained 0·5% by weight of a ketose-containing polysaccharide and this was absent from organisms obtained direct from animals.—R.M.

Cernea, I., Butură, I. & Drăghici, C. (1960). Cercetări asupra imunităţii active natural dobîndite în pasteureloza bovină. **[Naturally acquired active immunity to pasteurellosis in cattle and buffaloes.]** — Lucr. Inst. Pat. Igienă anim., Bucureşti **10,** 161-170. [In Roumanian. Summaries in French and Russian.] **631**

Healthy cattle housed with cattle experimentally infected with haemorrhagic septicaemia acquired strong active immunity. After cohabitation for 30 days the healthy cattle resisted inoculation of 0·2 ml. of culture that

killed non-immune cattle in a dose of 0·002 ml. After cohabitation for 5 days, 0·5 ml. of serum protected mice from 4 m. l. d. of pasteurella injected s/c.

After 48 hours' cohabitation with buffaloes ill with spontaneous pasteurellosis, a buffalo resisted challenge with a dose of culture that killed a non-immune control in 24 hours. Serum from this immune buffalo also protected mice.—R.M.

Smith, G. R. (1960). **Virulence and toxicity of Pasteurella haemolytica in the experimental production of ovine septicaemia.** — J. comp. Path. **70**, 429-436. [Author's conclusions modified.] **632**

The tissues of 6-month-old lambs which died from natural septicaemic infections of *Past. haemolytica,* type T, contained numerous viable bacteria.

Very high i/v doses of a freshly isolated T strain killed 7-month-old lambs and adults, but smaller doses were not fatal. With smaller doses a relationship between age and resistance was demonstrable, in that bacteria were eliminated more rapidly from the peripheral circulation of adults than of lambs.

The lethal dose of heat-killed broth culture for lambs by i/v inoculation was only a low multiple of the lethal dose of living culture.

Agrimi, P. (1960). Pasteurellosi pura in suini. **[Primary pasteurellosis in pigs.]** — Zooprofilassi **15**, 43-49. **633**

In a herd of 130 pigs (vaccinated with crystal violet swine fever vaccine 4 months previously and kept under good nutritional and hygienic conditions) 2 died without premonitory symptoms and *Pasteurella multocida* was isolated from viscera, lymph nodes and bone marrow. The organism was pathogenic for mice, g.pigs and rabbits but spleen filtrate was not pathogenic for pigs. Symptoms observed in 25 other pigs 6 days later were: fever, anorexia and extensive, oedematous, purplish swellings at the base of the ears, in the throat, snout and forelegs; two died and the other 23 were isolated and treated with immune serum and penicillin. All recovered but in 5 the skin and underlying tissues of the affected areas became necrotic and sloughed off. The rest of the pigs in the herd were treated with serum and vaccine and there was no further incidence.—T.E.G.R.

Clark, D. S. & Godfrey, J. F. (1960). **Atypical Pasteurella infections in chickens.** — Avian Diseases **4**, 280-290. [Authors' summary modified.] **634**

Two strains of pasteurella, biochemically and serologically different from *Past. multocida,* have become an important problem in the respiratory disease complex in southern California. One strain appeared to be the same as that described by Hall *et al.* (1955) as *Past. gallinarum.* The other was similar serologically, but different biochemically.

Infection appeared to be chiefly secondary, most often associated with infectious coryza, often with other respiratory diseases.

Prevention of the primary virus infections and improvement of management were effective means of preventing the disease. Killed autogenous vaccines or *Past. multocida* vaccines were not successful. Treatment with sulphonamides, particularly sulphaquinoxaline, was effective. Addition of 0·0125% sulphaquinoxaline to the feed was of value in avoiding severe outbreaks.

Redaelli, G. & Perini, G. (1960). Contributo allo studio della mastite bovina da "Pseudomonas aeruginosa". **[Bovine mastitis due to Pseudomonas pyocyanea.]**—Arch. Vet. Ital. **11**, 273-296. [Summaries in English, French and German.] **635**

An account is given of an outbreak of *Ps. pyocyanea* mastitis in 16 of 17 lactating cows. The infection was of a benign catarrhal type characterized by frequent relapses (15 in one cow). There was a tendency to spontaneous healing and in animals in which it tended to become chronic, good results were obtained by topical application of a combination of polymyxin B, neomycin and dihydrostreptomycin. The source of infection was contaminated well water used for watering the animals and washing their udders before milking. Weather, nutrition and trauma from milking machines were possible contributory factors.—T.E.G.R.

Guillot, G., Pigoury, L., Bobin, A., Michel, C., Ott, A., Chabassol, C. & Poussot, A. (1960). Etude d'une Klebsiella pneumoniae pathogène isolée chez le chien. **[A pathogenic strain of Klebsiella pneumoniae isolated from a dog.]** — Rev. Cps Santé Armées **1**, 551-559. **636**

In Tunisia, *K. pneumoniae* [*Bact. friedländeri*] was isolated from the blood and bone marrow of a dog that died with pulmonary symptoms. The strain was highly pathogenic for mice. A dog inoculated i/v developed intermittent fever, paresis of the

hind legs, and lost its voice. Cultural and biochemical properties and sensitivity to antibiotics were studied.—M.G.G.

Schildbach, R. (1960). Ein Beitrag zur Pathogenese der Colimastitis unter besonderer Berücksichtigung des Makro- und Mikroklimas. **[Pathogenesis of coli mastitis in cows, with reference to the role of climate and micro-climate.]**—Inaug. Diss., Munich pp. 46. **637**

Of 45 cases of mastitis in stabled cows, 29 occurred between May and September. A fall in air temp. was associated with 35 cases. Many were associated with a relative air humidity of over 80% and air movement in the region of the udder of over 0·2 metres per sec. in summer and over 0·15 m./sec. in winter. Bacteria of the coli-aerogenes group were isolated from 25 cases.—M.G.G.

Kramer, T. (1960). **Edema disease of swine. I. Study of hemolytic Escherichia coli strains isolated from cases of edema disease of swine in Western Canada.**—Canad. J. comp. Med. **24,** 289-294. [Summary in French. Author's summary modified.] **638**

Forty-two haemolytic strains isolated from pigs with oedema disease were examined serologically and biochemically. Of the three serotypes commonly associated with oedema disease, serotype 0141 : K (B)?: NM was found in 71% of all cases. This serotype was also found frequently in Ontario : the Ontario and Western Canadian strains were identical serologically but differed in their biochemical reactions.

Hinshaw, L. B., Vick, J. A., Carlson, C. H. & You-Ling Fan. (1960). **Role of histamine in endotoxin shock.** — Proc. Soc. exp. Biol., N.Y. **104,** 379-381. [Authors' summary modified.] **639**

Intravenous injection of lethal doses of *E. coli* endotoxin in anaesthetized dogs results in rapid decrease in total blood histamine, a concomitant rise in plasma histamine, and increased peripheral vascular responsiveness to histamine. These findings support the view that histamine performs a crucial role in progressive development of hypotension following administration of endotoxin.

Taylor, J. (1960). **Food poisoning. (b) Salmonella and salmonellosis.**—Roy. Soc. Hlth J. **80,** 253-259. **640**

Tables list the salmonella types isolated from man, domestic animals, animal feedingstuffs, and egg products in England and Wales from 1956 to 1958. The incidence of salmonellosis would be reduced by heat treatment of egg products and animal feedingstuffs.—M.G.G.

Francis, D. W., Campbell, H. & Newton, G. R. (1960). **The use of furazolidone for chukar partridges.** — Avian Diseases **4,** 218-223. [Authors' summary modified.] **641**

There was great reduction in mortality from *Salmonella anatum* infection in young chukar partridges *(Alectoris gracea)* when 0·011% furazolidone was added to the food starting immediately after hatching.

There was significant increase in body weight of chukar partridges fed the drug to either 3 or 4 weeks of age. Visible signs of toxicity were not observed when the drug was fed for eight weeks.

The isolation of *S. derby* in 1957 and *S. anatum* in 1959 from chukar partridges reared at a game farm in New Mexico is reported.

Vandeplassche, M. & Devos, A. (1960). Uitscheiding van brucella-kiemen in het sperma van een hengst. **[Excretion of brucella in the semen of a stallion.]**—Vlaams diergeneesk. Tijdschr. **29,** 199-204. [In Flemish. Summaries in English, French and German.] **642**

The authors investigated infertility in a Belgian draught stallion aged 6 years and found that the semen quality was poor. Organisms resembling brucella were seen in smears of semen and agglutination tests on serum were positive at 1 : 1,280. The stallion had received milk from a brucella-infected herd when two years old. After chloramphenicol therapy (7 g. by mouth daily for 3 weeks) the semen improved in quality and no more brucella were seen in it. Normal fertility returned.—R.M.

McDiarmid, A. (1960). **Symposium on brucellosis. The prophylaxis of brucellosis in cattle.** — Vet. Rec. **72,** 917-920 & 921. Discussion: pp. 943-948. [Author's summary modified.] **643**

The difficulties of keeping a non-vaccinated herd free from brucellosis are stressed and the method of control by blood testing is compared and contrasted with the general policy of vaccinating with Strain 19 with or without the elimination of infected animals. Local surveys of incidence might help in assessing from time to time, the effect of the vaccination programme on the control of the disease; the advantages of a non-

agglutinogenic killed adjuvant vaccine are also mentioned. Economic loss associated with brucellosis may have been largely masked by widespread vaccination and may be greater than is realized at present.

(1960). **Symposium on brucellosis. II. Kerr, W. R. Brucella eradication schemes in Northern Ireland. III. Van Waveren, C. M. The control of brucellosis in cattle in the Netherlands.** — Vet. Rec. 72, 921-927; 928-932 & 933. Discussion: pp. 943-948. **644**

In Northern Ireland, a compulsory scheme was started as a public health measure in 1959 to eradicate brucellosis from the Grade A herds whose milk is sold unpasteurized direct to the public, and a Register of brucella-free herds has been established which is now open on a voluntary basis to all herds. Because vaccination of adult cows had been widely practised contrary to regulations with consequent persistent blood titres, no single diagnostic test was reliable and tests on blood, whole milk and whey and vaginal mucus were performed on all cows. As the udder was the organ most commonly infected, the ratio of infection of the udder to uterus being approx. 3 to 1, the milk test has been helpful in differentiating vaccinal blood titres from those of a field infection except in early lactation and in the drying-off stage. In the primary scheme, if all tests showed no reactors in a herd, screening of milk samples only from every milking cow is repeated every 3 months whilst in herds showing definite reactors, after their removal, complete tests are repeated quarterly until they are clean. To qualify for the Brucellosis Register, compliance with various regulations and a certificate of 2 complete free tests are necessary. A temporary dispensation in the primary scheme milk regulations which require a brucellosis-free certificate by May 1961 has been allowed for "persistent-titre" herds where tests and history indicate them to be free from field infection. Control of negative herds and of herds found to be infected which are now approaching a clean state has been successful and is discussed and tabulated.

In 1951, the voluntary control of brucellosis in cattle was started through the Provincial Health Services for Animals in tuberculosis-free areas in the Netherlands. Can-milk samples were tested by the ring (ABR) test and when 3 negative quarterly tests and negative blood tests on all yearling cattle had been obtained, a Brucellosis-free Certificate was issued. Registration continues as long as the quarterly ring test remains negative. Later a second class of farm, ABR free, was introduced to facilitate sales of healthy cattle from herds which had not yet been able to register as brucellosis free. In 1957, after all Dutch cattle herds had been declared free from TB., a programme of organized brucellosis control was instituted in all areas by the Industrial Board for Agriculture. After preliminary ABR tests on can-milk samples, the Huddleson-Carlson plate agglutination test which is highly conclusive when the results are negative is carried out in ABR positive herds. All doubtful and positive serum samples are then tested by the tube agglutination test and all doubtful reactors are further submitted to the complement-fixation test which has been simplified in such a way that since 1958 it is practicable for mass testing. If necessary, agglutination at 56°C. and the Coombs test are performed. Since 1958, the voluntary basis of control has been modified, compensation paid for slaughtered reactors, but a levy imposed on infected farms which will only be repaid if they are brucellosis free by May 1963. In 1960 certain areas have been designated in which no infected cattle may be kept. The percentage of freed farms has risen from 69 in 1956 to 82·5 whilst the infection percentage has fallen from over 30 to below 10. Vaccination is now rarely practised, but should probably be continued on and around infected farms.—A. Ackroyd.

Weins, D. (1959). Quantitative Untersuchungen über den Brucellengehalt des Fleisches banginfizierter Rinder. **[Quantitative studies on brucella in meat from infected cattle.]**—Inaug. Diss., Munich pp. 39. **645**

Brucella was isolated, by culture and g.pig inoculation, from the muscle of 10 of 53 cattle positive serologically for *Br. abortus* infection. The number of colonies in culture of 2-g. samples of muscle never exceeded 5, and the g.pigs had low blood titres, mild course of infection and a low content of brucella in their organs.—M.G.G.

Entel, H. J. (1960). Zur Frage des Brucellenvorkommens bei serologisch oder allergisch positiv sowie negativ reagierenden Schafen. **[Presence of brucella in sheep positive or negative to serological and allergic tests.]**—Rindertuberk. u. Brucellose 9, 51-59. **646**

Br. melitensis was isolated from 3 of 17 sheep positive to serological tests, one of 11

sheep positive to both serological and allergic tests, 4 of 29 sheep positive only to the allergic test, and 2 of 9 negative sheep. It was isolated from the spleen in 7 sheep, the blood in 5, and the kidney in one. All 36 samples of muscle and 18 of bone marrow were negative.

—M.G.G.

Parnas, J., Lysikowska, L. & Kuziela, T. (1960). Über die Beziehungen zwischen der Empfindlichkeit gegen Antibiotika, der Virulenz und dem Stoffwechsel von Brucella brucei-Stämmen. [**Relationships between sensitivity to antibiotics, virulence, and metabolism of brucella strains.**]—Zbl. Bakt. I. (Orig.) **180,** 68-79. [Summaries in English, French, Spanish and Russian. English summary modified.] **647**

Twelve strains of brucella were obtained that were resistant to streptomycin and 15 to chlortetracycline. The resistant strains were examined over 16 months. Those resistant to streptomycin were stable in this respect, while resistance to chlortetracycline was unstable.

Streptomycin-resistant strains showed on each of three comparisons with the same group of the original strains an increase in urease and catalase activity and greater formation of H_2S. Special bacteriostatic and serological changes were not noted. The group of chlortetracycline-resistant strains showed similar changes.

Strains which had increased in virulence, also showed greater urease activity when compared with the original strains.

Heilman, D. H., Rice, E., Howard, D. H., Weimer, H. E. & Carpenter, C. M. (1960). **Tissue culture studies on bacterial allergy in experimental brucellosis. II. The cytotoxicity of nucleoprotein fractions of brucellae.**—J. Immunol. **85,** 258-267. [Part of authors' introduction.] **648**

In a previous paper it was reported that a specific cytotoxic effect on cells from a sensitized host could be elicited with a whole cell Brucella antigen [*V.B.* **28,** 2420].

In studies on the chemical components of Brucella, Stahl *et. al.* (1939) observed that the nucleoprotein fraction was responsible for eliciting the delayed allergic reaction. They prepared brucellins from smooth strains of the three species of Brucella and demonstrated that they were not type specific.

The purpose of this report is to present the results of a study of the *in vitro* cytotoxic activity of commercial brucellergen and of similar nucleoprotein fractions prepared from each of the three species of Brucella.

Dodd, D. C. & Brakenridge, D. T. (1960). **Leptospira icterohaemorrhagiae AB infection in calves.**—N.Z. vet. J. **8,** 71-76. [Authors' summary modified.] **649**

This paper records the isolation of *L. icterohaemorrhagiae AB* for the first time in New Zealand. The infection was found in dairy calves (4-6 weeks old) on 13 farms in South Auckland and Hamilton. The duration of illness was usually 24 to 36 hours. The recovery rate was low. The onset was sudden and affected calves were dejected and very weak, had sub-normal temperature and laboured respirations, and often were unable to stand. Jaundice was rare. P.M. examination usually revealed a large volume of watery pleural and peritoneal fluid and always marked oedema of perirenal tissues. The lesions and their histology indicated that the main damage was to capillaries and small veins and to the parenchymatous cells of the liver and kidneys, which showed evidence of acute toxaemia. Serum samples from affected and in-contact calves failed to show any titre to *L. icterohaemorrhagiae.* The infection was set up in g.pigs and from the heart blood the organism was obtained in pure culture in Schüffner's medium. The public health aspects are discussed.

Kolochine-Erber, B. & Mailloux, M. (1960). Les leptospiroses porcines en France. Seconde enquête et isolement de Leptospira pomona. [**Leptospirosis of pigs in France. Isolation of L. pomona.**]—Ann. Inst. Pasteur **99,** 359-375. [Summary in English.] **650**

Of 1,347 pigs from various regions of France, 286 (21%) had agglutinins for leptospira: 125 for *L. pomona,* 98 for *L. icterohaemorrhagiae,* 14 for *L. mitis,* and 49 for 7 other serotypes. Most of the titres to *L. pomona* and *L. mitis* were high, whereas those to *L. icterohaemorrhagiae* and other serotypes were nearly all low. Many sera agglutinated more than one serotype. *L. pomona* was isolated from the kidney of one of 27 pigs.

—M.G.G.

I. Lyubashenko, S. Y., Novikova, L. S., Pichugin, L. M., Molchanov, S. G. & Khun Shan-Ven. (1960). [**Leptospirosis in pigs.**]—Veterinariya, Moscow No. 8 pp. 33-38. [In Russian.] **651**

II. Salei, P. I., Shitov, K. A. & Solov'ev, S. I.

(1960). **[Leptospiral abortion in pigs.]** — Ibid. pp. 39-40. [In Russian.] **652**

I. Twenty piglets aged between 17 and 100 days were infected with one of three types: *L. grippo-typhosa* "var. icteranaemia I", *L. pomona* "var. icteranaemia II", and *L. icterohaemorrhagiae* with the object of clarifying the differential diagnosis of leptospirosis. Pigs aged 17–32 days were more susceptible than older pigs. Leptospires were cultured from blood as early as 5–6 days after infection. Excretion in the urine also commenced 5–6 days after infection and persisted for the duration of illness (up to 48 days). The microagglutination-lysis reaction was specific and high titres were present in blood from 4 or 6 days after infection. Changes in composition of blood and urine were an early indication of infection. It was observed that leptospirosis may be complicated by paratyphoid.

II. During a period of four months there were 120 abortions, 17 still-births and 548 normal farrowings on several farms in the Voronezh area and leptospiral antibodies were found in the sera of sows that aborted. Nutritional factors and brucellosis were excluded.—R.M.

Wolff, J. W. & Bohlander, H. J. (1960). **Serological classification of five strains of leptospires to the 'hyos' serogroup.**—Trop. geogr. Med. **12**, 173-179. **653**

One strain was isolated from a normal pig in Brazil, three were from opossums trapped in Georgia, U.S.A., and the fifth was of human origin.—R.M.

Fulthorpe, A. J. & Thomson, R. O. (1960). **Antigenic efficiency of tetanus toxoids modified by excess formalin or by heat and phenol.** —Immunology **3**, 126-134. [Authors' summary modified.] **654**

The reduction in antitoxin-combining power of tetanus toxoids prepared with excess formalin is correlated with a fall in antigenicity in g.pigs. This reduction in combining power is greatly underestimated by the flocculation test.

Highly purified toxin appears to be more susceptible to denaturation by formalin than crude toxin, and very small quantities of formalin are required to prepare toxoid from material from which amino-acids and other dialysable formalin-fixing compounds present in nutrient media have been removed.

There does not appear to be any significant difference in the antigenicity of tetanus toxoids of widely different purity in terms of Lf/mg. protein nitrogen (Lf being the antitoxin-combining power by flocculation).

Samples of tetanus toxoid heated at 50° for different periods in the presence of 0·5% phenol progressively lose antitoxin-combining power; this loss is greatly underestimated by the flocculation test.

Antigenicity tests on samples of toxoid treated in this way, show a significant increase in antigenic response in g.pigs after short periods of heating, followed by a rapid fall in response on prolonged heating.

Inukai, Y. & Haga, T. (1960). **Growth of Clostridium botulinum type E (Iwanai) in semi-synthetic medium.**—Jap. J. vet. Res. **8**, 127-133. [In English. Authors' summary modified.] **655**

For adequate growth at least casamino acids, tryptophan, cysteine, thioglycollate, glucose, inorganic salts, nicotinamide, biotin, pyridoxine, thiamine, folic acid and Ca-pantothenate were necessary. In this medium, the growth of the bacteria was about 70% of that in liver-broth, while the production of toxin was one-tenth the yield in liver-broth.

Seffner, W. (1960). Zur Bedeutung der Vibrio-fetus-Infektion als Verkalbe-Ursache beim Rind. **[Importance of Vibrio fetus as a cause of abortion in cows in the Halle district.]**—Zuchthyg. FortpflStörung. u. Besamung **4**, 202-207. [Summaries in English and Russian.] **656**

V. fetus was isolated from 250 (20%) of 1,227 aborted calves in 4 years. After brucellosis (27%), it was the second most important cause of abortion in cows. Of 73 strains, 68 were catalase-positive.—M.G.G.

Boyd, H. & Reed, H. C. B. (1960). **Investigation into the incidence and causes of infertility in dairy cattle. Brucella abortus and Vibrio fetus infections.**—Vet. Rec. **72**, 836-846; 870-874 & 875. **657**

Of 3,935 cows in 177 herds in south-west England, 4·9% were positive to the ring test, and 0·9% of 2,670 cows were positive to the vaginal mucus agglutination test. Non-specific reactions to the ring test were associated with the second half of gestation, immunization of adults with Strain 19, and the presence of colostrum. The conception rate was poorer in infected herds than in those free from infection, but differences between positive and negative animals within infected herds were not significant. The agglutination test for

V. fetus infection was positive or doubtful in 4% of 4,964 samples of vaginal mucus. There was no difference in fertility between positive and negative animals, and no other indication that vibriosis was present.—M.G.G.

van Ulsen, F. W. (1960). Abortus beim Rind durch Salmonella und Listeria. [**Abortion in cows caused by salmonella and listeria.**] — Dtsch. tierärztl. Wschr. **67**, 425-429. [Summary in English.] **658**

S. dublin was isolated from 113 and *Listeria monocytogenes* from 100 of 9,723 aborted calves in Overijssel province, Holland, between 1950 and 1959. Most of the abortions were isolated cases. Of the cows with salmonella abortion, about 80% had no other illness, and were later shown to be symptomless excretors of the organism. Of the cows with listeria abortion, only 4 showed other signs of illness. The month with the greatest number of listeria abortions was January. A possible connexion with silage feeding was discussed.—M.G.G.

I. Lecce, J. G., Justice, W. H. & Elliott, G. A. (1960). **Significance of husbandry, pleuropneumonia-like organisms and Hemophilus influenzae suis in the pathogenesis of porcine polyserositis with arthritis.** — J. Amer. vet. med. Ass. **137**, 345-347. **659**

II. Lecce, J. G. (1960). **Porcine polyserositis with arthritis: isolation of a fastidious pleuropneumonialike organism and Hemophilus influenzae suis.**—Ann. N.Y. Acad. Sci. **79**, 670-676. Discussion: pp. 756-758. **660**

I. A field outbreak of infectious serositis (Glaesser's disease) was described. Pigs reared relatively free from pathogens were very susceptible to the disease upon transfer to an ordinary piggery, presumably contaminated with *Haemophilus influenzae-suis*. Fortunately an outbreak could be controlled by antibiotic therapy (*e.g.* a combination of penicillin and dihydrostreptomycin).

II. Infectious serositis (Glaesser's disease) occurred in piglets aged 6–8 weeks experimentally reared without colostrum at North Carolina State College. PPLO were isolated from liver, spleen and joint fluid by inoculating penicillin-treated emulsions into chick embryos. Media had to be supplemented with fresh yeast extract and pig serum before the organism would grow. It was compared with the PPLO isolated from tendovaginitis in fowls [*V.B.* **26**, 1283]. Intraperitoneal inj. of the porcine agent into piglets led to non-fatal fibrinous pericarditis, pleuritis and peritonitis and the agent was recovered from liver, spleen and joints. *Haemophilus influenzae-suis* was also isolated from pigs with Glaesser's disease: when inoculated into piglets it caused fever, weakness, gastroenteritis, cystitis and death. Thus the bacterium plus PPLO probably acted together in causing Glaesser's disease.—R.M.

Hörter, R. (1960). Resistenzprüfungen an Vibrio fetus und anderen Keimen mit "Myacyne" (Neomycin-Sulfat). [**Susceptibility to neomycin of Vibrio fetus, Pseudomonas pyocyanea, Escherichia coli and other bacteria.**] — Zuchthyg. FortpflStörung. u. Besamung **4**, 196-201. [Summaries in English and Russian.] **661**

Neomycin at a concentration of 0·005 mg./ml. inhibited the growth of *Listeria monocytogenes, Corynebacterium murium,* and 4 strains of *V. fetus;* at 0·05 mg./ml. inhibited *E. coli, C. pyogenes* and *Staphylococcus albus;* and at 0·5 mg./ml. inhibited *Salmonella dublin,* but not *Ps. pyocyanea* and *E. rhusiopathiae.* —M.G.G.

Gowland, G. (1960). **Antibody response of the domestic fowl to two soluble bacterial antigens.**—Nature, Lond. **187**, 624. **662**

In studies of the primary and secondary antibody responses of fowls to soluble bacterial antigens, ten birds were injected intramuscularly with either diphtheria or tetanus alum-precipitated toxoid.

Serum samples were obtained before inoculation and afterwards at intervals of 3–4 days for 31 days. A second dose was given 65 days after the first and serum samples obtained at intervals of 2–3 days for 15 days.

Antibody to diphtheria toxoid appeared on the 10th day rising to a maximum on the 14th day and, following the second dose, appeared on the 3rd day reaching the maximum by the 10th day. The response to tatanus toxoid was similar but, in general, was delayed three days.

The maximum antibody concentrations reached were 0·1 I.U. diphtheria antitoxin and 3·0 I.U. tetanus antitoxin per ml. serum primarily and then 5·0 I.U. and 65 I.U. respectively from the secondary injection.

There was considerable individual variation but no interference occurred between antigens inoculated at the same time, one in either leg.—J. H. Darbyshire.

Shepard, C. C. (1960). **Phagocytosis of microorganisms by HeLa cells. I. The use of**

bovine fetal serum for the study of mycobacteria and certain other Gram-positive bacteria. II. Serum activities resembling properdin.—J. Immunol. **85,** 356-360 & 361-367. [Abst. from author's introduction.] **663**

The phagocytosis-promoting activities of the serum component of the tissue culture medium are of two general types. The first type, concerns mycobacterium, staphylococcus, and group A streptococcus, and it is observed with horse serum and bovine foetal serum. It is also seen when the serum is replaced by a combination of two purified proteins, bovine fetuin and human albumin. The second type of activity concerns the promotion of phagocytosis of *Pasteurella tularensis* by dog serum, and that of *Brucella* spp. and *Histoplasma capsulatum* by guinea-pig serum. These activities have properties that resemble those described for properdin.

Maddy, K. T., Crecelius, H. G. & Cornell, R. G. (1960). **Distribution of Coccidioides immitis determined by testing cattle.**—Publ. Hlth Rep., Wash. **75,** 955-962. [Authors' summary modified.] **664**

From various areas of Arizona, 11,643 cattle 1–6 years of age were coccidioidin tested and 2,859 (24·6%) were positive. Whereas previous human skin test surveys have given only indefinite indications of the extent of the endemic areas, this study revealed rather definite boundaries and the relative infectivity of various parts of the endemic area of the State.

The low altitude areas of Yavapai and Mohave Counties and additional areas of Gila County were established as endemic areas for the first time, and several areas above 5,500 feet altitude previously suspected of being infected, were found to be non-infective to cattle.

Maddy, K. T., Reed, R. E., Trautman, R. J. & Snell, V. N. (1960). **Experimental bovine coccidioidomycosis.**—Amer. J. vet. Res. **21,** 748-752. [Authors' summary modified.] **665**

Ninety-three cattle were each inoculated by the intratracheal route with 500,000 to 2 million viable particles of the saprophytic phase of *Coccidioides immitis.* No signs of illness were observed in 90 to 130 days. Precipitin antibody formation in inoculated animals was erratic. Complement-fixation antibodies were not detected. Serology did not afford a useful method for assaying progress of the disease or determining susceptibility. Most of the inoculated cattle developed skin sensitivity to coccidioidin, but not all preparations of coccidioidin evoked reactions.

Saslaw, S., Maurice, G. E., Cole, C. R. & Carlisle, H. N. (1960). **Experimental histoplasmosis in large domestic animals.**—Proc. Soc. exp. Biol., N.Y. **105,** 76-78. [Authors' summary.] **666**

Intratracheal inoculation of yeast phase *H. capsulatum* produced non-fatal infection in horses, cattle, sheep and swine as determined by clinical response, development of positive skin tests, production of antibodies, or histopathologic changes. Intravenous inoculation caused fatal infection in a horse.

Straub, M. & Schwarz, J. (1960). **General pathology of human and canine histoplasmosis.**—Amer. Rev. respir. Dis. **82,** 528-541. [Summaries in French and Spanish. Authors' summary modified.] **667**

Healed or healing lesions of primary histoplasmosis were found in 20 of 100 dogs from the Cincinnati area. Roentgenograms of the lungs and spleen proved helpful in demonstrating the lesions. All positive cases had primary pulmonary foci. More than one primary focus was found in 4 human cases and in 13 of the dogs. Some cases of canine primary pulmonary histoplasmosis resembled the epidemic type of the disease in man. In all the human cases except one the lymph nodes draining the primary focus were involved but this was not so in nine of the dogs. Splenic calcifications were found in more than 60% of the human cases; a few also had hepatic calcifications; in the dogs the spleen was never involved.

Manktelow, B. W. (1960). **Yeasts of the genus Pityrosporum in the mammalian external auditory canal with special reference to the dog.**—N. Z. vet. J. **8,** 76-78. [Author's summary modified.] **668**

The isolation of *Pityrosporum canis* from the external ears of dogs is described. The significance and the possible role of this organism in otitis externa is discussed. A new lipophilic yeast isolated from the ear of an opossum, is not considered sufficiently different from *Pityrosporum ovale* to warrant specific rank. The mammalian external ear is considered to be a suitable habitat for members of the genus *Pityrosporum.*

Guilhon, J. & Jolivet, G. (1960). Essais de traitement interne de la teigne microsporique des carnivores. **[Treatment of ringworm in four dogs and six cats by oral administration**

of griseofulvin.]—Bull. Acad. vét. Fr. **33**, 369-373. **669**

Ringworm was cured in 3 cats given 45–55 mg./kg. of griseofulvin by mouth daily for 3–4 weeks and regressed in 3 others treated for 2–3 weeks. In 4 dogs spores could still be found after treatment for 3 weeks to 2 months with 30–80 mg./kg.—M.G.G.

Vanbreuseghem, R., Dekeyser, P. & Lauwers, R. (1960). Culture sur terre non stérile de divers dermatophytes. [**Cultivation of dermatophytes on unsterilized soil.**]—Ann. Soc. belge Méd. trop. **40**, 415-421. [In French. Summaries in English, German, Spanish and Flemish.] **670**

Horse and g.pig hairs infected with *Trichophyton mentagrophytes* were placed on soil and incubated in a moist atmosphere at 25°C. The fungus grew on sterilized soil, unsterilized soil, and unsterilized soil mixed with rabbit faeces but not on such soil mixed with human or fowl faeces. It was pathogenic for g.pigs when re-isolated 2–4 weeks later. *T. verrucosum* in cow's hairs appeared to grow on sterilized and unsterilized soil, but could not be re-isolated, either by culture or g.pig inoculation. *Microsporum canis* grew on both sterilized and unsterilized soil and was re-isolated 4 weeks later.—M.G.G.

Marples, M. J. & Smith, J. M. B. (1960). **The hedgehog as a source of human ringworm.**—Nature, Lond. **188**, 867-868. **671**

Twenty-six living and dead hedgehogs collected in New Zealand were examined for pathogenic fungi. Isolates of *Trichophyton*, similar in macroscopic and microscopic characters, were recovered from seven. Positive cultures were obtained from the quills of four and from the hair on the ventral body wall, the head or the ears of a further three. A hedgehog isolate was identified as *Trichophyton mentagrophytes*.—R.M.

Lundvall, R. L. & Romberg, P. F. (1960). **Persistent diarrhea in colts associated with infection with Aspergillus fumigatus.** — J. Amer. vet. med. Ass. **137**, 481-483. **672**

Aspergillus fumigatus was isolated from the faeces of 3 colts, 10 months old, which for over 4 months had persistent diarrhoea that did not respond to bacteriostatic drugs. The diarrhoea was controlled by giving liquefied faeces from normal horses as a high enema and as a drench and by treatment with nystatin.—M.G.G.

Kaplan, W. & Ivens, M. S. (1960). **Fluorescent antibody staining of Sporotrichum schenckii in cultures and clinical materials.**—J. invest. Derm. **35**, 151-159. **673**

Rabbits were hyperimmunized against *S. schenki*. Globulin fractions from serum of the rabbits was labelled with fluorescein isothiocyanate. The labelled preparation was used to stain smears of lesions. Sporotrichum cells were easily detected by fluorescence microscopy—other fungi did not fluoresce. —R.M.

Fagard, P., Thienpont, D., Vandervelden, M. & Vandesteene, R. (1960). Hépatite à Nocardia asteroides chez le cheval. [**Hepatitis in a horse due to Nocardia asteroides.**] — Bull. Soc. Pat. exot. **53**, 241-250. **674**

A horse aged 9 years in the Congo became more and more emaciated until it died. It had not been possible to establish a diagnosis before death. There were multiple abscesses in the enlarged liver and fungal filaments were seen in histological sections of the lesions. The fungus was isolated by sowing pus from the liver onto four media and incubating them under aerobic conditions. Sensitivity tests indicated that the fungus was sensitive to sulphonamides, viomycin, chloramphenicol, streptomycin, neomycin and nitrofurazone; it was insensitive to penicillin and the tetracyclines.—R.M.

Mahoney, D. F. (1960). **The occurrence of bovine contagious pleuropneumonia in travelling cattle in Northern Australia.**—Aust. vet. J. **36**, 367-371. [Abst. from author's summary.] **675**

Nine outbreaks were investigated between 1951 and 1953. 12,015 head were involved, and 102 clinical cases of the disease were detected and examined P.M. It was concluded that: (a) 59 acute cases in vaccinated cattle were probably due to prevaccination infection. The long and variable incubation period could be responsible for cases up to 4 months after vaccination, when cattle might have walked 1,000 miles from their property of origin. (b) The inclusion of some unvaccinated animals in mobs allowed the disease to spread; there were 27 acute cases in unvaccinated animals. Faulty vaccination technique probably accounted for inadequate immunity in one mob. (c) The five chronic cases were probably infected before vaccination. (d) Seven acute cases were ascribed to failure of animals to develop adequate immunity. (e) Only 0·5% of vaccinated animals probably failed to

develop serviceable immunity under the conditions of the outbreaks.

Yoshida, T., Suwa, T., Okazaki, K. & Watanabe, M. (1960). **[Studies on contagious bovine pleuropneumonia. I. Antigenic variants for the complement-fixation test.]**—Bull. Nat. Inst. Anim. Hlth, Tokyo No. 40 pp. 53-64. **676**

Yoshida, T., Suwa, T., Ishitani, R. & Watanabe, M. (1960). **[Studies on contagious bovine pleuropneumonia. II. Experimental infection of calves with virulent and mutant strains.]** — Ibid. pp. 65-76. [In Japanese. Summaries in English.] **677**

I. The c.f. test with 12 samples of bovine immune serum received from countries abroad was positive for all of 5 strains of the bovine contagious pleuropneumonia agent received from Africa and Australia, but not for 2 strains that had been isolated in China in 1930 and passaged in artificial media. But all 7 strains cross-reacted with immune sera prepared by the authors in rabbits and goats.

II. Two of 3 calves infected by the intrapulmonary route with an Australian strain had fever, respiratory symptoms, and leucopenia, while a calf infected with a cultured strain [see preceding abst.] remained normal. A calf inoculated i/v with the heat-killed virulent strain was later resistant to this strain, whereas one given the heat-killed cultured strain was not. The cultured strain had no antigenicity for the c.f. test, but the antigenicity of virulent and cultured strains for the precipitation test did not differ.—M.G.G.

Orue, J., Mémery, G. & Thiéry, G. (1960). Lymphotropisme et migration de Mycoplasma mycoïdes, agent de la péripneumonie contagieuse bovine, dans les lymphatiques périphériques. **[Lymphotropism and migration of the agent of bovine contagious pleuropneumonia in peripheral lymphatics.]**—C.R. Acad. Sci., Paris **250**, 4070-4072. **678**

Direct lympho-angiography revealed a dense network of lymph vessels within the dermis of West African cattle (examined at Dakar). The rapid migration of the PPLO along lymphatics after intradermal inoculation explained why this route of injection produced no local reaction, while s/c inj., into an area poor in lymphatics, did result in an oedematous reaction.—R.M.

Orue, J. & Memery, G. (1960). Note sur la vaccination intradermique contre la péripneumonie contagieuse bovine. **[Intradermal immunization against bovine contagious pleuropneumonia.]**—Bull. Acad. vét. Fr. **33**, 411-418. **679**

Of 220 cattle immunized i/d in the upper, outer part of the ear with either cultured or avianized vaccine, only a few developed local reactions, and all those challenged were immune.—M.G.G.

Pollock, M. E., Kenny, G. E. & Syverton, J. T. (1960). **Isolation and elimination of pleuropneumonia-like organisms from mammalian cell cultures.**—Proc. Soc. exp. Biol., N.Y. **105**, 10-15. **680**

Contamination with PPLO was found in 89 of 166 lines of cells from man, ox, pig, monkey, rabbit, mouse and other animals. Preliminary experiments indicated that kanamycin killed PPLO in cell cultures.

—R.M.

Nelson, J. B. [Edited by.] (1960). **Biology of the pleuropneumonialike organisms.** — Ann. N.Y. Acad. Sci. **79**, Art. 10. pp. 305-758. **681**

This collection of 52 papers forms the proceedings of a conference held at the New York Academy of Sciences in January 1959. They are arranged in seven parts, with a discussion at the end of each part:—morphology and classification; isolation and propagation; classification; physiology; serology and chemotherapy; human pathology; animal pathology.

Fifteen papers are concerned with avian PPLO, three with the organism of contagious bovine pleuropneumonia, one with bovine genital strains, and one each with caprine and porcine strains. Some of the papers will be abstracted separately.—R.M.

Olson, N. O., Seymour, W. R., Boothe, A. D. & Dozsa, L. (1960). **Characteristics of PPLO isolated from the genital and respiratory tracts of cattle.**—Ann. N.Y. Acad. Sci. **79**, 677-685. Discussion: pp. 756-758. [Authors' summary modified.] **682**

Organisms that resembled PPLO in colonial characteristics were isolated from the genital tracts and noses of cattle in West Virginia. However, biochemical reactions suggest that they are either L-phase bacteria or PPLO that have not been previously described.

Cordy, D. R. & Adler, H. E. (1960). **Patterns of reaction in infection with a virulent form of PPLO from goats.**—Ann. N.Y. Acad. Sci.

79, 686-695. Discussion: pp. 756-758. [Authors' introduction modified.] **683**

Earlier work [*V.B.* **28,** 2085] has demonstrated that the pleuropneumonia-like organisms (PPLO) isolated from a septicaemic and arthritic disease of goats are also pathogenic for sheep and pigs by i/v and i/p inoculation. Subsequent experiments have been undertaken to define the host range of this infection and to study the patterns of reaction in sheep exposed by various routes.

I. Gentry, R. F. (1960). **Differentiation of avian PPLO and bacterial forms.** — Ann. N.Y. Acad. Sci. **79,** 403-409. **684**

II. Kelton, W. H., Gentry, R. F. & Ludwig, E. H. (1960). **Derivation of Gram-positive cocci from pleuropneumonialike organisms.**— Ibid. 410-421. **685**

III. McKay, K. A. & Truscott, R. B. (1960). **Reversion of avian pleuropneumonialike organisms to bacteria.** — Ibid. 465-480. [Authors' summaries modified.] **686**

I. Avian PPLO were cultured by six different methods. Bacteria were recovered from 37 to 75% of the cultures and they were mainly Gram-positive cocci. G. suggested that avian PPLO should be divided into the true pathogenic forms or *Mycoplasma,* and the non-pathogenic strains that revert to bacteria (L forms).

II. Bacterial forms were derived from 21 avian, 3 human, 3 canine and 1 saprophytic strain of PPLO. Two bacterial strains derived from avian PPLO were *Str. faecalis* var. *liquefaciens.* The other 27 bacterial cultures were micrococci. In one experiment bacterial forms were derived from 21 avian PPLO within 3 transfers in shallow broth cultures, and 18 distinct bacteria were obtained. Contamination was ruled out as the source of the bacteria.

III. Reversion of avian PPLO to *Haemophilus gallinarum* occurred only from organisms passaged in eggs. Reversion occurred spontaneously or was induced by adding saline extracts or crude DNA extracts of *H. gallinarum.*

Cover, M. S., Benton, W. J. & Whelan, M. A. (1960). **The thermostability of chicken serum to be used in the PPLO agglutination test.**— Ann. N.Y. Acad. Sci. **79,** 567-573. Discussion: pp. 608-614. [Authors' summary modified.] **687**

Freezing the serum used in the PPLO tube or plate agglutination test increased the ability of a positive serum to agglutinate the antigen. The duration of the storage in the frozen state had no effect on this reaction. In the tube agglutination test, heating the serum at 37°C. for as long as 120 min. did not influence the agglutinating power of the serum, but heating it for 10 min. at 56°C. completely destroyed the activity of the sample except in one case. Centrifugation of the serum did not alter the test. Serum samples that did not show agglutinating properties by the tube test were not affected by the freezing or by the heating used in this experiment. Samples stored at 4°C. for up to 32 days did not lose their agglutinating ability. The results of the serum plate test did not agree with the tube test with regard to the effect of freezing and the effect of heating (56°C.).

Kiser, J. S., Popken, F. & Clemente, J. (1960). **Antibiotic control of an experimental Mycoplasma gallinarum (PPLO) infection in chickens.** — Ann. N.Y. Acad. Sci. **79,** 593-607. Discussion: pp. 608-614. [Authors' conclusions modified.] **688**

Tetracycline at 400 p.p.m., chlortetracycline or leukomycin at 200 p.p.m., or spiramycin at 50 p.p.m. in the feed controlled rather severe experimental infections with PPLO. Erythromycin in young birds was unsatisfactory, as no dose gave normal growth or prevented mortality.

Streptomycin, chlortetracycline, and spiramycin at 0·63 mg. a bird injected into the abdomen once daily for 10 days controlled the infection but when the number of doses was reduced to 5 only 2·5 mg. doses of streptomycin were effective.

I. Edward, D. G. ff. & Kanarek, A. D. (1960). **Organisms of the pleuropneumonia group of avian origin: their classification into species.** —Ann. N.Y. Acad. Sci. **79,** 696-702. **689**

II. Olesiuk, O. M. & Van Roekel, H. (1960). **Pathological and immunological observations concerning avian pleuropneumonialike organisms.**—Ibid. 727-740. [Discussion: pp. 756-758. Authors' summaries modified.] **690**

I. The authors studied biological and serological properties of 40 strains from respiratory infection in fowls and turkeys. Eleven strains were identified as *Mycoplasma gallinarum;* another eight were regarded as a new species, *M. iners:* fifteen were regarded as a third species, *M. gallisepticum.*

II. Chronic respiratory disease of fowls and infectious sinusitis have a wide distribution and are of great economic importance: they are caused by the same PPLO. The

significance of egg transmission was emphasized. Clinical signs, pathological changes, immunology and control were discussed.

I. Adler, H. E. (1960). **Mycoplasma, the cause of chronic respiratory disease.**—Ann. N.Y. Acad. Sci. **79**, 703-712. **691**

II. Gianforte, E. M., Skamser, L. M. & Brown, R. G. (1960). **Experimental reproduction of chronic respiratory disease.** — Ibid. 713-717. **692**

III. Ose, E. E., Barnes, L. E. & Gossett, F. O. (1960). **Induced PPLO infection in young chickens.**—Ibid. 718-726. [Discussion: pp. 756-758. Authors' summaries modified.] **693**

I. The organisms associated with chronic respiratory disease (CRD) do not revert to bacteria during repeated passage in culture media, chick embryos and birds. The organisms can produce CRD in fowls and turkeys after a number of culture passages and after high dilution.

II. Intraperitoneal injection of an avian PPLO culture together with a porcine strain of *Klebsiella pneumoniae* [*Bact. friedländeri*] reproduced the CRD syndrome. Inhalation of aerosol of these organisms, gave rise to a similar but milder disease. The bacterium appeared to enhance PPLO infection. Laryngotracheitis vaccine was not as good an enhancing agent as the bacterium. The experimental infection might be useful for screening therapeutic drugs.

III. A pathogenic avian strain of PPLO propagated in Grumbles' broth and inoculated by the combined intravenous and air sac routes consistently produced a measurable infection in chicks.

See also abst. **978** (report, Pasteur Institute, Viet-Nam).

DISEASES CAUSED BY PROTOZOAN PARASITES

Leach, T. M. & El Karib, E. A. A. (1960). **Prophylaxis against repeated artificial challenge with Trypanosoma congolense. A comparative trial of antrycide prosalt and prothidium bromide.** — J. comp. Path. **70**, 385-395. [Authors' conclusions modified.] **694**

The prophylactic qualities of Antrycide Pro-salt and Prothidium Bromide against bovine trypanosomiasis were compared by subjecting groups of treated cattle to regular, repeated syringe challenge with *T. congolense*. The first persistent infection in a beast treated with Prothidium occurred 215 days after treatment and 8 days after this group of cattle received their fourth challenge. The first persistent infection in an ox treated with Antrycide was observed 258 days after treatment and 24 days after this group received their seventh challenge.

Challenge at intervals of 4 weeks was continued until 54 weeks after treatment and details are given of all transient and persistent infections observed. The significance of the former is discussed.

Three of six cattle inoculated with 5 mg. per kg. Prothidium Bromide died 55 to 63 days after treatment in circumstances suggestive of drug toxicity.

Williamson, J. & Stephen, L. E. (1960). **A test for drug-resistant trypanosomes in experimental tsetse-fly challenge of cattle.**—Ann. trop. Med. Parasit. **54**, 366-370. [Authors' summary modified.] **695**

A test for the presence of homidium-resistant trypanosomes in batches of tsetse fly from different areas of Northern Nigeria was facilitated by the use of sheep as test animals.

Infections produced in sheep by the application of infected tsetse flies were treated with a subcurative dose of homidium, the interval between treatment and relapse being taken as an index of the degree of homidium resistance.

Drug resistance was correlated with the geographical origin of different infected fly batches; resistant strains were detected only in areas where drug-treated cattle were or had been present.

Grewal, M. S. (1960). **On a new trypanosome, Trypanosoma helogalei Grewal, 1956, from the blood of an African mongoose, Helogale undulata rufula Peters (Peters' pigmy mongoose).** — Indian J. med. Res. **48**, 418-432. **696**

This non-pathogenic trypanosome was described in detail, with four plates of illustrations. Mongoose, mice, rats, guinea-pigs and hamsters could be infected with it but ferrets and fowls could not.—R.M.

McMillan, B. (1960). **The inhibition of leptomonads of the genus Leishmania in culture by antifungal antibiotics.**—Ann. trop. Med.

Parasit. **54,** 293-299. [Author's summary modified.] **697**

The culture of bone-marrow from a case of Mediterranean kala-azar, later proven, was negative on a number of occasions. It was thought that this negative finding might have been due to the addition of antibiotics (100 units crystalline penicillin, 100 units streptomycin sulphate, and 50 units nystatin per ml.) to the culture medium.

Whilst penicillin and streptomycin were not inhibitory at the concentrations used, nystatin completely inhibited the growth of leptomonads at 25–50 units per ml., and in some cases retarded growth at 2 units per ml. Fungizone, another antifungal antibiotic, was inhibitory at 0·01–0·05 mg. per ml. Heparin did not affect growth at 150 units per ml.

There is a growing tendency to add antibiotics to culture media for the control of bacterial and mycotic contamination. It is recommended that antifungal antibiotics should not be added to leishmanial cultures, or perhaps to protozoal cultures generally.

Lesser, E. (1960). **Cultivation of Histomonas meleagridis in modified tissue culture media.** — J. Parasit. **46,** No. 5 Sect. 2 p. 43. [Author's abst. modified.] **698**

H. meleagridis has been successfully cultured in a variety of tissue culture media ("199," "NCTC 107," "NCTC 109," and Eagle's), each modified by the addition of (1) cream sterilized by passage through a Selas filter, (2) an antibiotic-treated nutrient broth culture of turkey caecal bacteria, and (3) large quantities of penicillin G potassium, dihydrostreptomycin sulphate, and nystatin. The cultures were sealed with vaseline. The modified "199" medium was used for all routine cultivation.

The histomonads have now been maintained through more than 90 transfers, and some have been subcultured more than 55 times without evidence of the presence of viable bacteria.

When Seitz filtrates of bacterial cultures, autoclaved cultures, or cultures heated at 56°C. for 60 min. were used instead of the antibiotic-treated bacterial cultures, no histomonad growth occurred. It therefore appears that one or more heat labile intracellular factors present in turkey caecal bacteria are essential for growth of *H. meleagridis* in culture.

Marquardt, W. C. (1960). **Oocyst production in subclinical infections with coccidia in cattle.** — J. Parasit. **46,** No. 5 Sect. 2 p. 46. [Author's abst. modified.] **699**

A total of 181 faecal oocyst counts were made on five calves starting in October and ending in March. Three species, *Eimeria ellipsoidalis, E. bovis* and *E. canadensis,* comprised the majority of oocysts. The agent causing winter coccidiosis, *E. zürn,* comprised 6 to 16% of all oocysts and it occurred in 17 to 45% of samples. *E. ellipsoidalis* occurred in 44 to 75%, *E. bovis* in 83 to 97% and *E. canadensis* in 44 to 58% of all samples.

Two of 4 calves aged 3 months, reared under conditions of minimum exposure to coccidia, were placed with two 8-month-old calves: there was no indication of transmission of *E. zürni,* or any other species, to the younger calves after three months' contact.

Svanbaev, S. K. (1960). **[Syntomycin (oxytetracycline) for coccidiosis in lambs.]** — Veterinariya, Moscow No. 6 pp. 37-38. [In Russian.] **700**

The antibiotic was given by mouth in 1 g. doses twice a day for five days to spontaneously infected lambs and to lambs infected with over 5,000 oocysts of *E. faurei, ninae-kohl-yakimovi,* and *intricata.* A month after treatment only isolated oocysts were found in the faeces.—R.M.

Nemeséri, L. (1960). Beiträge zur Ätiologie der Coccidiose der Hunde. I. Isospora canis sp. n. **[Aetiology of coccidiosis in dogs. I. Isospora canis.]**—Acta vet. Acad. Sci. hung. **10,** 95-99. [In German.] **701**

N. proposed the name *Isospora canis* for the agent of coccidiosis in dogs. The oocysts are shorter and rounder than those of *I. felis.* No oocysts were excreted by 10 puppies infected experimentally with *I. felis,* nor by 10 kittens infected with *I. canis.* Dogs excreted *I. canis* oocysts on the 11th day of experimental infection. They were found in the faeces of 18 of 220 dogs in Hungary.

—M.G.G.

Horton-Smith, C. (1960). **Symposium on poultry disease and the practitioner. Coccidiosis.** — Vet. Rec. **72,** 967-970. [Author's summary.] **702**

The biological characteristics of the life-cycles of four species of coccidia are considered in relation to the development of the associated diseases. The diseases, their economic importance and possible control are also discussed.

Joyner, L. P. (1960). **The coccidiostatic activity of 3, 5-dinitro-ortho-toluamide against Eimeria tenella.**—Res. vet. Sci. **1,** 363-370. [Author's summary modified.] **703**

This drug gave the best results against *E. tenella* when administration was commenced early in the life cycle of the parasite and maintained for at least 7 days. Good control of the infection was effected by 0·01 or 0·0125% in the food commencing at the time of infection and maintained for 10 days. Higher doses given for the first 5 days of the infection delayed mortality 4–5 days after the withdrawal of the drug.

Gerriets, E. (1960). Die präventive Wirkung des Vitamin A bei der Blinddarmcoccidiose von Hühnerküken. **[Preventive action of vitamin A in caecal coccidiosis in chicks.]**—Dtsch. tierärztl. Wschr. **67,** 485-488. [Summary in English.] **704**

Losses from coccidiosis were 6%–19% in 4 groups each of 100 chicks fed vitamin A or fish-liver oil, compared with 76%–87% in 4 groups not given vitamin A. In chicks reared in unsuitable quarters, losses from coccidiosis were 100% in chicks not given vitamin A, 67% in those given increasing doses of vitamin A in the drinking water daily from 15 i.u. in the second week to 105 i.u. in the eighth week of life, 38% in those given 30–210 i.u., 24% in those given 45–315 i.u., and only 6% in those given 60–420 i.u.—M.G.G.

Krassner, S. M. (1960). **Quantitative aspects of Eimeria acervulina infections.**—J. Parasit. **46,** No. 5 Sect. 2 pp. 45-46. [Author's abst. modified.] **705**

Chickens 1 week to 2 months old were infected with one million sporulated oocysts. Until 72 hours after infection the parasite was found only in the anterior part of the small intestine, but afterwards all along the intestine. The number of merozoites of the first and second generations per infected cell averaged 13 and 19 respectively.

In cells stained with acridine orange the cytoplasm of the parasite fluoresced red-orange while its early nucleus fluoresced light orange. When the merozoite is mature, the nucleus fluoresces yellow.

Observations on gut washings showed the oocysts to be free in the lumen at intervals. The highest concentration appeared at about 102 hours after infection.

Chicks became better hosts of the parasite as they grew older up to the age of 2 months. This was tested by the oocyst yield of infected birds. Birds which had been previously infected became resistant to further infections.

Clarkson, M. J. (1960). **The coccidia of the turkey.**—Ann. trop. Med. Parasit. **54,** 253-257. [Author's summary modified.] **706**

The characters of three species of *Eimeria,* all isolated as pure strains, are described and compared.

The species were readily distinguishable by the criteria suggested by Tyzzer (1928), *i.e.,* oocyst characters, duration of life-cycle, host-specificity, pathogenicity, distribution and morphology of developmental forms, gross and microscopic pathology, and cross-immunity, but indistinguishable on the morphology of the oocysts alone.

This is of importance, not only zoologically but also in the post-mortem diagnosis of turkey coccidiosis, especially as *E. meleagridis* produces marked lesions but is not responsible for disease. The distribution of the lesions produced by the sexual stages of the three species forms a rapid and accurate method of establishing a specific diagnosis.

Hall, W. T. K. (1960). **The immunity of calves to Babesia argentina infection.**—Aust. vet. J. **36,** 361-366. [Author's summary modified.] **707**

The influence of exposure of cows to *B. argentina* by blood inoculation during pregnancy on the susceptibility of their calves to infection with this organism was studied in two groups each of 9 pregnant cows from which 8 calves were used in the experiment. One group was inoculated three times during pregnancy with blood containing *B. argentina.* The other group was not inoculated.

In the inoculated group 6 calves up to 35 days of age did not show any clinical symptoms following inoculation with infected blood whilst one calf 43 days of age and one calf 52 days at inoculation were clinically infected. Subsequent subinoculations from all 8 calves showed them to be infected.

All calves from the non-inoculated group were more severely affected than any of those in the infected group.

The question of whether the immunity was conferred by prenatal infection was investigated. Blood drawn at birth from the calves in the inoculated group when injected into susceptible splenectomized animals, did not produce infection in the recipients. This indicated that a passive immunity had protected the calves from clinical symptoms.

Radkevich, P. E. (1960). **[Combined therapy with antibiotics and chemotherapeutic agents of Theileria annulata infection in cattle.]**— Veterinariya, Moscow No. 6 pp. 23-25. [In Russian.] **708**

Two courses of treatment were proposed. The first consisted of i/v inj. of aminoacriquine at 3·5 mg./kg. in 1% soln. followed after 10 min. by i/m inj. of biomycin (chlortetracycline) hydrochloride at 0·3 g./kg. in 10 ml. of 2% procaine soln. in the morning; in the evening s/c inj. of haemosporidin at 0·5 mg./kg. in 2% soln.; treatment repeated on the following two days. The second method started with i/v inj. of sulphantrol at 5 g./kg. plus 60 ml. of 4% glucose soln. plus 100 ml. of normal saline, followed 10 min. later by i/m inj. of oxytetracycline at 3 mg./kg. in 20 ml. of 2% procaine soln. On the second day aminoacriquine was injected i/v in the morning and Berenil (3·5 mg./kg.) was inj. i/m in the evening. On the third day trypaflavine (euflavine) was injected i/v (3·5 mg./kg. as 1% soln.) in the morning and haemosporidin s/c in the evening.

Of 25 cattle treated by the first method 19 recovered while of 49 treated by the second method 42 recovered. 78 controls were treated by one or other of the drugs alone and only half of them recovered.—R.M.

Gibson, C. L. & Jumper, J. R. (1960). **The prevalence of canine toxoplasmosis in Memphis, Tennessee.** — J. Parasit. **46,** 559-565. [Authors' summary modified.] **709**

Two series of stray dogs were studied by the Sabin-Feldman dye test and by inoculation of tissues into laboratory mice.

In the first series, antibodies (all titres) were detected in 45·3% of 137 sera, with 29·9% having titres less than 1 : 16 and 15·3% showing titres of 1 : 16 or higher. No parasites were isolated.

In the second series, 663 dogs were screened by the dye test and 106 (16%) had titres of 1 : 16 or higher. Brain tissue from 54 positive dogs was inoculated into mice, and *Toxoplasma* infection was detected in 2 adult dogs, 1 female and 1 male, having antibody titres of 1 : 256 and 1 : 1,024.

Analysis of the serological findings on the 800 dogs of both series showed that antibodies were equally frequent in males and females; antibodies at low titres (less than 1 : 16) were much more prevalent in rural dogs than in urban dogs, but at higher titres (1 : 16 or above) there was little difference; antibodies were more prevalent in adult than in young dogs at titres of 1 : 16 or higher.

Koestner, A. & Cole, C. R. (1960). **Neuropathology of canine toxoplasmosis.** — Amer. J. vet. Res. **21,** 831-844. [Authors' summary modified.] **710**

The central nervous systems (c.n.s.) of 63 dogs with confirmed toxoplasmosis were studied; 43 had experimental infections and 20 spontaneous. Lesions in the c.n.s. attributed to toxoplasmosis, were found in 47 dogs (74%). *Toxoplasma gondii* was demonstrated microscopically in the c.n.s. of 25. Toxoplasmosis of the c.n.s. was characterized by vascular damage and focal necrosis in acute cases and by glial nodules and repair in chronic cases. Extracellular organisms were found in relation to necrotic foci in dogs with acute infections, and intracellular toxoplasms and cysts in dogs with chronic disease. Nineteen dogs were classified as having latent infections.

Ruptured cysts and hyperergic response were characteristics of reactivated latent toxoplasmosis. Lesions were found in all parts of the c.n.s. Young dogs were more susceptible and congenital infections resulted in the most severe and extensive lesions. Congenital toxoplasmosis was found in two consecutive litters born to the same bitch.

The incidence of brain and cord lesions in canine toxoplasmosis is high and of great diagnostic significance.

Bonaduce, A. & Romagnoli, A. (1960). Ricerche sulla toxoplasmosi sperimentale del cane. I. Sensibilità del cane al Toxoplasma ed osservazioni cliniche. **[Experimental toxoplasma infection in dogs. I. Susceptibility and clinical symptoms.]** — Zooprofilassi **15,** 123-129. **711**

Three to four days after i/p inoculation with a strain of *Toxoplasma* ("BK") 3 young dogs in a group of 20 (aged 2 months to 7 years) developed fever and systemic symptoms (one also developed skin lesions) and died on the 7th–13th days. Death ensued in mice inoculated i/p with material from the skin lesions. In the other dogs (which were killed after 30 days) there were no clinical manifestations or P.M. findings. It is stated that the cause of death of the 3 dogs and of the mice was toxoplasmosis.—T.E.G.R.

Werner, H. & Seidlitz, P. (1960). Experimenteller Beitrag zur connatalen Toxoplasmose. I. Mitteilung. Über den Befall der

weiblichen Genitalorgane von Maus und Goldhamster durch Toxoplasma gondii nach intravenöser. intraperitonealer und intrauteriner Injektion. II. Über den Verlauf der Toxoplasma Infektion in Uterus, Tube und Ovar von Maus und Goldhamster nach intrauteriner Injektion. **[Studies on congenital toxoplasmosis. I & II.]**—Zbl. Bakt. I. (Orig.) **178,** 250-262 & 393-406. **712**

Werner, H. (1960). Experimenteller Beitrag zur connatalen Toxoplasmose. III. Mitteilung: Über die Infektion des Trophoblasten bei der Maus durch Toxoplasma gondii. **[Studies on congenital toxoplasmosis. III.]** —Ibid. **180,** 118-135. [Summaries in English, French, Spanish and Russian.] **713**

All parts of the female genital system of mice and hamsters except the ovarian follicle and the cylindrical epithelium of the oviduct were susceptible to invasion by toxoplasma. Parasites which gained access from blood or lymph first went to the ovary and subsequently to the uterus, forming within the endometrium "true" pseudocysts, generally between 65 and 72 hours after infection.

When the endometrium of pregnant infected mice was eroded by the trophoblast any pseudocysts present were released from their surrounding capsule. The results were either (1) formation of necrotic lesions at the sites of placenta formation; (2) haematogenous dissemination of parasites to all organs of the mother; (3) penetration of parasites into cells of the syncytio-trophoblast. Trophoblast cells attacked in this way are not destroyed and during the formation of chorionic villi the parasites may enter foetal blood vessels. A further path of infection was through the amniotic fluid into the gastro-intestinal tract of the embryo.—R.M.

van der Waaij, D. (1960). **Congenital transmission of avirulent Toxoplasma gondii after experimental infection in mice prior to gestation.**—Trop. geogr. Med. **12,** 251-257. **714**

Thirty mice were inoculated s/c with about 20 oocysts of the Burk strain at various stages of pregnancy. Toxoplasma was transmitted to foetuses when the mother was infected in the first half of pregnancy; infection during the second half did not result in foetal infection. Only mice with cysts in the brain produced infected foetuses. Immunological aspects were discussed.—R.M.

van den Akker, S. & Goedbloed, E. (1960). **Pneumonia caused by Pneumocystis carinii in a dog.**—Trop. geogr. Med. **12,** 54-58. [In English. Summary in Spanish.] [Authors' summary modified.] **715**

Large numbers of *Pneumocystis carinii* were found in the lungs of a year-old dog that died from interstitial pneumonia. The various stages of development of the parasite are described; it is claimed that this is the first time a spontaneous pneumocystis-pneumonia has been observed in an animal. [But see *V.B.* **26,** 3767].

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

I. Yasin, S.-A. & Huq, M.-M. (1960). **Foot-and-mouth disease in Pakistan.**—Bull. Off. int. Epiz. **54,** May pp. 378-383. In English. [In French pp. 384-389.] **716**

II. Zahran, G. E. D. (1960). **Foot-and-mouth disease in the southern region of U.A.R.**—Ibid. pp. 390-393. [In English.] **717**

I. F. & M. disease is widespread in Pakistan. Types O, A, C, and Asia 1 have been identified. Control is by sanitary measures restricting the spread of infection. Vaccines are to be manufactured for immunizing pedigree herds.

II. The number of outbreaks of F. & M. disease reported in Egypt in each year from 1950 to 1959 was given. Types O, A, and SAT 2 were identified. The principal periods of outbreaks coincided with the seasonal migrations of birds. A project for a F. & M. disease Research Institute in Cairo is being studied.—M.G.G.

Anon. (1960). **United Nations. Report of the seventh session of the European Commission for the control of foot-and-mouth disease, held in Rome, Italy 16-18 March, 1960.** pp. 52. Rome: Food & Agriculture Organization of the United Nations. [FAO Meeting Report No. AN 1960/1.] **718**

Delegates described the current F. & M. disease situation in their respective countries, and there were comments based on visits of the Commission to Norway, Israel and Turkey. Among other points discussed were risks from imported meat and the necessity for maintaining a stock of vaccines against non-European types of virus. There is also a summary of the proceedings of a meeting of the Standing Technical Committee held at Lindholm in July 1959.—R.M.

Henderson, W. M. (1960). Contrôle, par régions, de la fièvre aphteuse dans les Amériques. [**Regional control of foot and mouth disease in the Americas.**]—Bull. Off. int. Epiz. **53**, 849-851. **719**

There are 2 organizations for the regional control of F. & M. disease in America. One comprises Mexico and the U.S.A., and the other consists of Mexico, the countries of Central America, and Panama. Four divisions of South America were proposed, in each of which nations could co-operate in the control of F. & M. disease.—M.G.G.

Esteves, M. B. (1959). Aplicação da reação de imunoaderência à tipificação do vírus aftoso. [**Application of the immune-adherence phenomenon to the typing of foot and mouth disease virus.**] — Arch. Inst. biol. S. Paulo **26**, 167-175. [Summary in English.] **720**

The components of the reaction were 0·2 ml. specific immune serum prepared against one of the three types of virus in g.pigs; 0·2 ml. antigen from epithelium of infected cattle or from infected tissue culture; 0·2 ml. guinea-pig complement; 0·1 ml. of a suspension of human erythrocytes. Serum, antigen and complement were mixed and incubated for an hour at 37°C. Then the erythrocytes were added and the mixture was incubated for a further hour. The mixture was allowed to cool for 30 min. and then examined. Complete agglutination indicated that virus and serum were of the same type; no agglutination occurred when they were not the same type.—R.M.

Henderson, W. M. (1960). Conditions minima requises pour l'importation de bétail en provenance d'un pays où existe un type de virus de fièvre aphteuse qui diffère des types de virus du pays importateur. [**Minimum conditions for the import of cattle from a country with a type of foot and mouth disease virus differing from those in the importing country.**] — Bull. Off. int. Epiz. **53**, 845-848. **721**

A French translation is given of recommendation No. 5 of the conference on F. & M. disease held at Bogotá in April, 1959. The recommendation was made with special reference to Columbia and Venezuela, where only types O and A occur, and includes these conditions: age of the imported animals not more than 2 years; isolation for at least 30 days in the country of origin, and quarantine in the importing country, in contact with susceptible animals, for at least 45 days; import of animals only from zones free from F. & M. disease for at least a year; a certificate stating that the animals have been free from vesicular diseases; no immunization against F. & M. disease during the 4 months preceding importation.—M.G.G.

Mazzini, C. A. (1960). Concentracion de suero antiaftoso monovalente y polivalente por medio del metanol. [**Concentration of foot and mouth disease hyperimmune serum by means of methanol.**] — Gac. vet., B. Aires **22**, 157-172. [Summaries in English and French.] **722**

Concentrates of monovalent and polyvalent hyperimmune sera against F. & M. disease obtained with 30% methanol were 5–8 times more potent than the original sera in protection tests in g.pigs.—M.G.G.

Verge, J., Paraf, A., Dhennin, L. & Asso, J. (1960). Propriétés immunigènes d'une souche de virus aphteux "lapinisé" de type C. Utilisation de cette souche pour la vaccination des bovidés. [**Immunization of cattle with a lapinized strain of foot and mouth disease virus, type C.**]—Bull. Off. int. Epiz. **53**, 619-629. **723**

In the course of 170 passages in rabbits of progressively increasing age, F. & M. disease virus, Type C, lost its virulence for cattle, but retained its immunogenicity. The percentage of cattle resisting challenge with virulent virus after immunization with virus of the 124th, 160th or 170th passage was 90% in those immunized intramuscularly, and 70% in those immunized subcutaneously. Post-vaccination reactions were more frequent with i/m inoculation, but after the 160th passage they were very mild.—M.G.G.

Petermann, H. G., Fontaine, J., Lang, R., Camand, R. & Leftheriotis, E. (1960). Recherche d'une souche modifiée de virus aphteux. [**Studies on a modified strain of foot and mouth disease virus.**]—C.R. Acad. Sci., Paris **251**, 1845-1846. **724**

Type O virus was passed 108 times in cultures of piglet kidney cells. Complement-fixation tests on culture fluid were negative; the virus was detected by virus neutralization tests. It failed to elicit a reaction in 80% of cattle inoculated into the tongue with 2 ml. of culture fluid, but the remaining 20% developed localized lesions without generalization. 66–75% of inoculated cattle resisted challenge with virulent virus.—R.M.

Mayr, A. & Wittmann, G. (1960). Virusdauerpassagen in Zellkulturen als modifizierender Faktor für die Entwicklung einer Lebendvaccine gegen die Maul- und Klauenseuche. **[Preparation of live foot and mouth disease vaccine from virus modified by continuous passage in cell culture.]**—Zbl. VetMed. **7**, 829-840. [Summaries in English, French and Spanish. English summary modified.] **725**

Type A4 virus was passaged 450 times in kidney cultures of the pig, calf and mouse. This greatly changed its virulence for ox, pig and infant mouse (the guinea-pig was not investigated), its cytopathic action on heterologous cultures, its contagiousness for ox and pig, and its immunizing properties.

Since the first modification of the virus was in a myotropic direction, it tended to lose its ability to proliferate in skin and mucous membranes earlier than in muscle. This change favoured the use of selected cell cultures to obtain a suitable combination of effectiveness and harmlessness.

The most significant modifications of the virus occurred by passage in pig kidney. Not only did the virulence decrease but the immunizing ability was reduced at the same time. Passage in pig kidney is thus less useful than passage in calf or mouse kidney as a method of modifying the virus for the development of a live vaccine.

Changes in virulence and contagiousness, whilst immunizing properties remained unaffected, were best achieved by passage in calf kidney cultures. After 370 passages the virus was so modified that when injected intramuscularly into cattle it was not transmissible by contact to pigs.

The type-specificity remained unaltered throughout the 450 passages in the three different types of culture.

Ceccarelli, A. (1960). Conservazione a basse temperature del virus aftoso coltivato in vitro su cellule renali. **[Resistance to low temperature of foot and mouth disease virus grown in tissue culture.]**—Zooprofilassi **15**, 33-36. [Summaries in English and French.] **726**

At 5°C. a freeze-dried strain of F. & M. disease virus, Type O, grown on calf trypsinized kidney cells survived for 4 months; at −30°C. survival time was over 6 months—slightly better than when the virus was not freeze-dried; at −79°C. the untreated virus survived for 8 months; the freeze-dried virus was not tested.—T.E.G.R.

Ubertini, B., Nardelli, L., Santero, G. & Panina, G. (1960). Immunisierungswert des Maul-und-Klauenseuche-Virus nach dessen Konzentration im Vakuum. **[Immunizing value of vacuum-dried foot and mouth disease virus.]** — Zbl. VetMed. **7**, 477-482. [Summaries in English, French and Spanish.] **727**

Guinea-pigs were immunized with formolized, adsorbed F. & M. disease vaccine, prepared from calf kidney cells, that had been reduced to a third of its volume by vacuum-drying. Their resistance to the virus was slightly but not significantly lower than that of g.pigs immunized with unconcentrated vaccine. —M.G.G.

Fédida, M. (1960). Rapports entre le taux des anticorps précipitants et le degré d'immunité provoqués chez le boeuf par la vaccination antiaphteuse. **[Relationship between precipitating antibodies and the degree of immunity in cattle inoculated with foot and mouth disease vaccine.]** — C.R. Acad. Sci., Paris **250**, 3425-3427. **728**

Fluid from vesicles was used as antigen in the double-diffusion precipitin test. Serum from immunized cattle reacted with the antigen to form a line of precipitation, the intensity of which was related to the "index of protection" described by Lucam & Fedida [*V.B.* **29**, 379 & 2429]. Serum from non-immune cattle did not react with the antigen. This test could be used to predict whether generalization of lesions would occur upon challenge with virus: of 61 cattle that developed secondary lesions, 60 were negative to the diffusion test while of 95 that did not develop secondary lesions, 71 were positive and 24 were negative to the test. Further tests with 600 sera from cattle inoculated with F. & M. disease vaccine showed that the test was an easy way of detecting circulating antibodies and it gave an approximate indication of the strength of immunity.—R.M.

Lucam, F. & Fédida, M. (1960). Recherche sur le moment d'apparition de l'immunité antiaphteuse post-vaccinale chez le boeuf. **[The time of establishment of immunity in cattle inoculated with foot and mouth disease vaccine.]**—C.R. Acad. Sci., Paris **251**, 1595-1597. **729**

Four commercial monovalent vaccines were each inoculated s/c into 4 cattle. Immunity was measured by the index of protection previously described. The best vaccines resulted in protection from 7 or 8 days after

inoculation, but the time was usually 8 to 11 days. Poor vaccine did not protect until 19 to 20 days after inoculation.—R.M.

Mackowiak, C., Lang, R., Fontaine, J., Camand, R. & Petermann, H. G. (1960). Etude de la durée de l'immunité conférée par le vaccin anti-aphteux. **[Duration of the immunity conferred by foot and mouth disease vaccine.]**—Bull. Off. int. Epiz. **53**, 781-792. [Summaries in English and Spanish.] **730**

The immunity given by a 10 ml. dose of trivalent saponin vaccine was studied for 2 years in over 200 adult cattle. The serum neutralization test on monolayers of pig kidney tissue was superior to challenge with virulent virus for the evaluation of immunity. Three weeks after immunization all of 43 cattle resisted challenge with 3 types of virus, but after 3 months 15% and after 5½ months over 20% developed generalized F. & M. disease on challenge. All the animals re-vaccinated after 5½ months resisted challenge 12 months after the second dose of vaccine. It was concluded that adult cattle should be given a second dose of vaccine 3–4 months after the first, in order to develop a solid immunity lasting about a year.—M.G.G.

Armbruster, O., Beck, W., Garbe, H. G., Pilz, W. & Schweckendiek, O. E. (1960). Versuche zur Bestimmung der Immunitätsdauer von 4 verschiedenen trivalenten MKS-Kulturvirus- und Naturvirus-Vakzinen am Rind. **[Duration of immunity derived from trivalent vaccines against foot and mouth disease prepared from cultured or "natural" viruses.]** —Mh. Tierheilk. **12**, 223-229. **731**

Forty cattle were divided into 4 groups of ten, and each group was immunized with one of 4 trivalent vaccines. Two vaccines had been prepared from cultured viruses and 2 from the tongue vesicles of cattle with F. & M. disease. Cattle immunized with cultured viruses were no longer immune to challenge with types O and C after 3 months nor to type A after 5 months, while the resistance of cattle immunized with "natural" viruses lasted 3–5 months against type O, and 8 months against types A and C.—M.G.G.

Schulze, P. (1960). Notiz zur Bedeutung der Temperaturerhöhung nach der Maul-und-Klauenseuche-Infektion vakzinierter Rinder. **[Significance of the rise in body temperature in immunized cattle after infection with foot and mouth disease virus.]** — Arch. exp. VetMed. **14**, 947-952. **732**

The body temp. of 1,040 cattle immunized against F. & M. disease and 431 unvaccinated cattle, nearly all 1–2 years old, was recorded before and after infection with F. & M. disease virus. A week after infection the animals were slaughtered. A temp. of over 40°C. or a rise of over 1·5°C. were considered to be signs of inadequate resistance.—M.G.G.

Lübke, A. (1960). Über eine starke Vermehrung des Maul- und Klauenseuchen-Virus in der Herzmuskulatur von Mäusen bei Hypoxydose durch experimentelle hämolytische Anämie. **[Increased multiplication of foot and mouth disease virus in the myocardium of mice with hypoxaemia caused by experimental haemolytic anaemia.]**—Zbl. VetMed. **7**, 656-663. [Summaries in English, French and Spanish. English summary modified.] **733**

Adult mice in which haemolytic anaemia had been produced by phenyl-hydrazine were infected with two strains of F. & M. disease virus of differing virulence. In the anaemic animals virus multiplication in the heart muscle was on an average a thousand times as great as in controls. Similarly, virus-induced myocarditis was commoner and more severe than in controls. It is suggested that the hypoxaemia in the heart muscle allows more of the tissues to be infected by virus. The hypothesis is put forward that increased metabolism of an organ affected by lack of oxygen can favour virus multiplication in it.

Seibold, H. R. (1960). **The histopathology of foot-and-mouth disease in pregnant and lactating mice.**—Amer. J. vet. Res. **21**, 870-877. [Author's summary modified.] **734**

Histopathological studies of pregnant and lactating mice infected with F. & M. disease virus type A (tissue culture) revealed that the major lesions were necrosis of pancreatic acinar cells, development of laminated intracytoplasmic bodies in some of the pancreatic acinar cells, severe myocardial necrosis, slight skeletal muscle necrosis, "accidental" involution of the thymus, and destruction of lymphocytes in the spleen and lymph nodes. The possible pathogenic relationships of both non-specific stress and direct action of virus to the lymphocytic destruction were discussed.

Ivanov, A. D. [Edited by.] (1960). **[Control of rabies in farm animals in the U.S.S.R. Abstracts of twelve papers submitted for pub-**

lication.]—Veterinariya, Moscow No. 10 pp. 45-50. [In Russian.] **735**

R. A. Kantorovich reported that in the Archangel oblast epidemics occurred in 1930/31 and 1955/56. There were numerous cases of rabies in dogs, cats, calves, piglets and goats during autumn 1955. Further South, in Orenburg oblast, E. M. Borisov and M. I. Garaev stated that between 1951 and 1956 there were 1,935 reported cases in animals, made up of 1,045 dogs, 390 cats, 302 cattle, 75 sheep or goats, 72 pigs, 30 foxes, 1 hedgehog, 6 birds and 21 other animals. The disease was transmitted more by wolves and foxes than by dogs. Every year over 750 wolves and 7–13 thousand foxes were destroyed.

In the Petrovsk district near the Finnish border 44 cattle were bitten by wolves: 24 died from rabies within 15 to 40 days of the incident and the remaining 20 died within the next 80 days. In two cows rabies developed two and 12 hours after normal calving, but the calves remained healthy.

V. V. Kovrizhnykh and N. P. Mezenev reported rabies in foxes, dogs and reindeer in the Chukotsk territory in the N.W. tip of the Soviet Union during the winter of 1958/59. Rabies in foxes was also reported from Mogilev oblast in the Belorusskaya SSR and from Lugansk oblast near Rostov-on-Don. Atypical rabies in cattle was described by G. A. Ugryumov and E. I. Drapalyuk.

According to M. P. Omel'chenko, strenuous efforts to eliminate stray dogs in Kiev did not reduce the incidence of rabies in dogs, but after mass vaccination (53 thousand in 1956/58) only isolated cases were seen in unvaccinated dogs: there has been no rabies in animals in Kiev since July 1958.

In Moscow, A. B. Kovrigin and B. N. Vizirov reported on a campaign to encourage citizens to surrender unwanted cats and dogs to the nearest veterinary clinic. There was annual anti-rabies inspection and vaccination of registered dogs during March and April. Every year about 10,000 stray dogs and 33,000 cats were destroyed.—R.M.

Dhindsa, D. S. (1960). **Antirabic vaccine from the buffallo calf's brain.**—Indian vet. J. **37,** 47-53. **736**

A series of 4 tests in mice indicated satisfactory virus titres in the brain of infected buffalo calves, and the yield of the vaccine from buffalo calf brain was 8–10 times that from sheep brain.—R. N. Mohan.

Puisségur, J. A. (1960). La vacunacion antirrabica y el eritema pruriginoso en el canino. El "shock" proteico. [**Rabies vaccination and itchy erythema in dogs: possibility of protein shock.**]—Gac. vet., B. Aires **22,** 173-175. [Summary in French.] **737**

Four dogs with itchy erythema of the abdomen and femoral region recovered spontaneously after immunization against rabies. It was suggested that equilibrium was restored by protein shock.—M.G.G.

Verts, B. J. & Barr, R. B. (1960). **Apparent absence of rabies in Illinois shrews.** — J. Immunol. **85,** 438. **738**

During two years 266 shrews were trapped. Brain and salivary glands examined by the mouse inoculation method provided no evidence of rabies.—R.M.

Huygelen, C., Thienpont, D., Dekeyser, P. J. & Vandervelden, M. (1960). **Paravaccinia infections in Ruanda-Urundi.** — Bull. epiz. Dis. Afr. **8,** 233-240. [Summary in French. Authors' summary modified.] **739**

Several cases of paravaccinia (false cowpox) in cattle were observed at Astrida (Ruanda-Urundi). The clinical symptoms and the course of the disease were studied in a herd of 15 cows over 18 months. Artificial transmission to cattle, though successful in some animals, gave irregular results. A laboratory assistant who had handled infective material, developed a typical milker's nodule. Sheep and goats showed a doubtful reaction. Attempts to propagate the virus in rabbits, g.pigs, baby mice, chorio-allantoic membranes or tissue cultures of bovine testis cells failed.

Flückiger, U. & Hofer, A. (1960). Intrakutane Impfung gegen Euterpocken (variola vaccina) mit lyophilisierter Pockenlymphe "Lancy-Vaxina". [**Intradermal vaccination against udder pox with freeze-dried pox lymph.**]—Schweiz. Arch. Tierheilk. **102,** 563-565. [Summaries in English, French and Italian.] **740**

In 11 herds of 75 cattle, 63 of which had udder pox, all the animals were inoculated i/d with freeze-dried pox lymph. Ointment was applied locally. Cure within 14 days was seen in 56 animals, and 7 recovered more slowly or needed a second vaccination. No further cases occurred in a year.—M.G.G.

Lindblad, G. (1960). Ett fall av fästingburen encephalit hos hund. [**Tick-borne encephalitis in a dog.**]—Medlemsbl. Sverig. VetFörb.

12, 416 & 417. [In Swedish. English summary modified.] 741

A bitch, 5 years old, showed symptoms of meningo-encephalitis, beginning 12 days after a heavy invasion of ticks. Complement-fixation test revealed significant rise of serum antibody titre against the virus of Russian spring-summer encephalitis from the first to the 13th day after onset of disease. The dog recovered completely after about 3 weeks.

Málková, D. (1960). **The role of the lymphatic system in experimental infection with tick-borne encephalitis. II. Neutralizing antibodies in the lymph and blood plasma of experimentally infected sheep.**—Acta virologica, Prague 4, 283-289. [In English.] 742

The virus was injected s/c or into a peripheral lymph vessel in sheep. Antibodies appeared in the lymph after 48–72 hours, and in the blood after about 96 hours. Antibodies first appeared when virus titres were falling. Antibody titres were higher in the lymph up to the 7th day, thereafter higher in the blood. Re-infection 7 or 12 days later increased the titres, particularly blood titres.—M.G.G.

Ihlenburg, H. (1960). Experimentelle Prüfung der Wirksamkeit des Präparates "Virolitine" gegenüber dem Bornavirus. [**Experimental evaluation of "Virolitine" (a Candida albicans product) against Borna disease virus.**] —Tierärztl. Umsch. 15, 371-374. 743

"Virolitine" [see *V.B.* **30,** 1451] was inactive against Borna disease virus both *in vitro* and in rabbits.—M.G.G.

Renieri, G. & Marraro, G. (1960). Sulla presenza di anticorpi neutralizzanti uno o più tipi di virus poliomielitico nella specie bovina e suina. [**Neutralizing antibodies to poliomyelitis virus in cattle and pigs.**]—Zooprofilassi 15, 619-625. 744

Of 122 cattle, 51% had neutralizing antibody to type 1 of poliomyelitis virus, 64% to type 2, and 38% to type 3. Of 51 pigs, 24, 22, and 7, respectively, had antibody to the 3 types. In the cattle, the incidence increased with age. Viruses of non-human origin, serologically related to human poliomyelitis viruses, were considered responsible.—M.G.G.

Collier, W. A., Bood, P. H. & van den Akker, S. (1960). **Infection experiments with parapoliomyelitis virus (Col SK virus) in young pigs.**—Trop. geogr. Med. 12, 91-96. 745

Young pigs were susceptible to intracerebral infection with Col SK virus. The disease was fatal or latent. After latent infection strong immunity accompanied by neutralizing antibodies developed. Myocarditis was found in fatal cases but there were no cerebral anomalies. After passage in pigs the virus appeared to lose some of its virulence for mice.—R.M.

Burtscher, H. (1960). Zum Vorkommen der Aviären Encephalomyelitis in Oesterreich. [**Occurrence of avian encephalomyelitis in Austria.**]—Zbl. VetMed. 7, 841-877. [Summaries in English, French and Spanish. English summary modified.] 746

This is the first report of avian encephalomyelitis (epidemic tremor) in Austria. The disease was found in a total of 114 chicks over a period of 2 years. Diagnosis was based on the clinical and histological findings and on positive transmission experiments, as well as the exclusion of similar diseases. Pathological study revealed several changes apparently related causally to the disease not hitherto reported in the literature.

Hwang, J., Luginbuhl, R. E. & Helmboldt, C. F. (1960). **The in vitro neutralization test with avian encephalomyelitis virus (AEV).**—Avian Diseases 4, 232-235. [Authors' summary modified.] 747

Virus neutralization tests against the virus were performed with pooled serum samples from 30 field cases, 12 breeding flocks, and six groups of normal chickens together with seven homologous, hyperimmune sera. The technique may be useful for assay of serum potency.

Dougherty, E., Jr. & Price, J. I. (1960). **Eastern encephalitis in White Pekin ducklings on Long Island.**—Avian Diseases 4, 247-258. [Authors' summary modified.] 748

Eastern encephalomyelitis was diagnosed in ducklings for the first time. The virus was isolated from ducks on five Long Island farms. The disease was characterized by sudden onset at one or 2 weeks of age of posterior paresis followed by paralysis. Morbidity was usually low (under 50%) and mortality varied from 2 to 60%. Gross lesions were lacking and microscopic lesions were confined to the central nervous system.

Evidence of contact spread of the virus to day-old ducklings is presented. Attempts to isolate the virus from *Culex melanura* larvae collected in the vicinity of the affected farms were unsuccessful.

An outbreak in farm-reared Long Island

pheasants is also recorded. This occurred at the same time as the duck outbreaks.

Thomas, L. A. & Eklund, C. M. (1960). **Overwintering of Western equine encephalomyelitis virus in experimentally infected garter snakes and transmission to mosquitoes.** — Proc. Soc. exp. Biol., N.Y. **105,** 52-55. **749**

Experiments with artificially infected garter snakes *(Thamnophis sirtalis parietalis* and *T. ordinoides vagrans)* revealed that the virus could survive the winter in snakes.

—R.M.

Saxer, E. & Fuentes M., R. (1960). Neuere Aspekte der Serologie bei der infektiösen Anämie der Einhufer (AIE). **[Serological aspects of equine infectious anaemia.]** — Schweiz. Arch. Tierheilk. **102,** 232-254. [Summaries in English, French and Italian.] **750**

Working in Venezuela, the authors found that the conglutination reaction and the agar gel diffusion test gave good diagnostic results. Further studies are in progress. [See also *V.B.* **30,** 2881.]—R.M.

Itikawa, O. & Shibata, T. (1960). **Cytochemical studies on equine infectious anaemia. V. Formation of polysaccharide-iron-calcium complex in the trabecular arteries of the spleen.** — Bull. Nat. Inst. Anim. Hlth, Tokyo No. 38 pp. 155-166. [In English, Summary in Japanese.] **751**

Microscopic crystals which gave staining reactions for polysaccharide, iron and calcium were identified beneath the endothelium in the intima of trabecular arteries in spleen from two-thirds of 147 infected horses and in one-third of non-infected horses. The lesion was usually accompanied by thrombosis of trabecular veins. Both types of change were rare in young horses.—R.M.

Anon. (1960). La peste équine. **[African horse sickness.]** — Bull. Off. int. Epiz. **53,** 1094-1101. [In English pp. 1102-1108.] **752**

A review of the distribution, transmission, symptoms, P.M. lesions, immunology, and prophylaxis of African horse sickness.

—M.G.G.

Hatziolos, B. C. & Reagan, R. L. (1960). **Neurotropism of equine influenza-abortion virus in infant experimental animals.**—Amer. J. vet. Res. **21,** 856-861. [Authors' summary.] **753**

Infant cats, white mice, and hamsters inoculated by various routes with equine influenza-abortion virus consistently developed lesions of encephalomyelitis with characteristic intranuclear inclusion bodies in the neuroglial cells. Characteristic lesions in the visceral organs or the nasal epithelium, or both, coexisted with the cerebral lesions only when the virus was introduced by the peritoneal or nasal routes, or both.

Gentry, G. A. & Randall, C. C. (1960). **Studies on hepatitis in hamsters infected with equine abortion virus. III. Nuclear protein changes. A histochemical study.**—Amer. J. Path. **37,** 433-441. **754**

Several histochemical methods were used to demonstrate the presence of protein in the intranuclear inclusions.—R.M.

Scott, G. R., Cowan, K. M. & Elliott, R. T. (1960). **Rinderpest in impala.** — Vet. Rec. **72,** 787-788. **755**

Although all game of the Order Artiodactyla are probably susceptible to rinderpest, the only species regularly incriminated in East Africa are buffalo, eland and wild pig. In a recent flare-up, in addition to these three species, deaths occurred in giraffe, bushbuck and impala. P.M. examination of a sick impala suggested an early stage of infection. Although precipitation lines did not develop when the lymph nodes were emulsified and diffused through agar against rinderpest hyperimmune rabbit serum, specific rinderpest complement-fixing antibodies were demonstrated by the more sensitive complement-fixation test.—A. Ackroyd.

Yashchinski, B. (1960). **Allergy in rinderpest.** —Bull. epiz. Dis. Afr. **8,** 199-202. [Summary in French. Author's summary modified.] **756**

Y. described the demonstration of positive intradermal allergic reactions for rinderpest using viable caprinized and lapinized rinderpest virus.

Nguyen-ba-Luong, Dai, N., Liem, N. V., Minh, N. N., Phu, L. H. & Vu Thien Thai. (1960). Le virus bovipestique lapinisé avianisé repassé sur lapin. **[A lapinized and avianized rinderpest virus.]**—Bull. Off. int. Epiz. **54,** May pp. 401-409. **757**

In Viet-Nam, over 600,000 cattle and 300,000 buffaloes have been immunized against rinderpest with a lapinized virus. As animals in central Viet-Nam tend to react severely to this virus, it is attenuated for use in these animals by passaging in chick embryos, followed by 8 further passages in rabbits; immunity lasts for at least 2 years.—M.G.G.

Otte, E. & Peck, E. F. (1960). **A note on a rinderpest-like disease of cattle in Ethiopia.** —Bull. epiz. Dis. Afr. **8**, 203-216. [Summary in French. Authors' summary modified.] **758**

The disease is characterized by mouth and vaginal lesions, salivation, lachrymation and nasal discharge. Usually it takes a mild and chronic course and is not noticed by the cattle owners. Occasionally, severely affected cases are seen in which, in addition to the above symptoms, fever, diarrhoea, anorexia, agalactia and nervous symptoms occur. The disease frequently causes abortion. It affects cattle of all ages, and intra-uterine infection takes place. All breeds irrespective of their state of immunity to rinderpest can become affected. The relationship of this disease to the mucosal disease complex and rinderpest is discussed.

Boulanger, P. & Bannister, G. L. (1960). **A modified direct complement fixation test for the detection of antibodies in the serum of cattle previously infected with vesicular stomatitis virus.**—J. Immunol. **85**, 368-374. [Authors' summary modified.] **759**

A modified direct complement fixation method for the detection of antibodies in heat-inactivated sera is described. The addition of fresh unheated bovine serum to the diluted guinea-pig complement constitutes the only modification: in its absence no fixation of complement is observed. The normal serum supplying the apparently essential heat-labile factor, is pre-tested for absence of non-specific reactivity with test antigen. Sera of animals around 6 months of age show less non-specific reactivity than sera of adult cattle.

This method when applied in testing serial bleedings from cattle infected with either the New Jersey or Indiana type of vesicular stomatitis virus, detected the antibodies 9 to 10 days after intralingual infection. Antibodies were demonstrable at a diagnostic level for at least 90 days afterwards.

The test was sufficiently specific to indicate the type of virus in epithelial tongue tissue at the acute stage of infection and to reveal the type-specificity of the antibodies in serum of convalescent cattle.

In indirect c.f. tests, the inhibition titres of early convalescent sera were much lower than those recorded in the modified direct c.f. test. The difference was negligible with hyperimmune sera.

Griesemer, R. A. & Cole, C. R. (1960). **Bovine papular stomatitis. I. Recognition in the United States.**—J. Amer. vet. med. Ass. **137**, 404-410. [Authors' summary modified.] **760**

Bovine papular stomatitis, reported for the first time in the U.S.A., is a mild viral disease of calves characterized by proliferative, papular lesions in and around the mouth; a long, mild course; and the lack of systemic signs. The disease appears to be widespread throughout the world with a morbidity approaching 100% in affected herds. The course is prolonged but afebrile, and treatment is not considered necessary. Awareness of papular stomatitis as a disease entity is particularly important since the lesions might be confused with early stages of F. & M. disease or with viral diarrhoea.

Henson, J. B. & Grumbles, L. C. (1960). **Infectious bovine keratoconjunctivitis. I. Etiology.**—Amer. J. vet. Res. **21**, 761-766. [Authors' summary modified.] **761**

Moraxella (Haemophilus) bovis was isolated from lacrimal secretions of 90% of cattle with clinical infectious bovine keratoconjunctivitis; it was not isolated from the aqueous humour of any. Other agents were not isolated from the lacrimal secretions and aqueous humour.

Infectious bovine keratoconjunctivitis was experimentally produced in 43 of 59 calves inoculated by three methods. Koch's postulates in respect of *H. bovis* were fulfilled.

This work strengthens the belief that *H. bovis* is the causal agent of infectious bovine keratoconjunctivitis.

Seffner, W. (1960). Erfahrungen zum Virusabort der Schafe unter besonderer Berücksichtigung der Diagnose mittels Komplementbindungsreaktion. **[Diagnosis of ovine virus abortion by the complement-fixation test.]**—Berl. Münch. tierärztl. Wschr. **73**, 284-287. [Summary in English.] **762**

In a sheep flock with virus abortion, the c.f. test was positive or doubtful in 33 of 34 aborting sheep, 107 of 261 sheep lambing normally, 11 of 28 non-pregnant ewes, 38 of 77 female yearling sheep, and 29 of 33 rams. Titres fell greatly during the 3–6 months after the lambing period. Aborting ewes and 48 reactors were culled, and no cases of virus abortion were observed in the following year. Results of the c.f. test in 4 other flocks with virus abortion were reported briefly. In one flock, results of s/c immunization 2 months before lambing with a formolized vaccine prepared from infected placenta were inconclusive.—M.G.G.

Tozzini, F. (1960). Anticorpi per i virus del gruppo psittacosi-linfogranuloma venereo in sieri ovini. **[Antibody to the psittacosis-lymphogranuloma group of viruses in sheep serum.]** — Zooprofilassi **15**, 607-617. [Summaries in English and French.] **763**

The antibody was demonstrated with the c.f. test in 95 of 208 sheep in 4 of 7 flocks in the Rome district. No signs of disease were seen in a flock with numerous low titres, but in the 3 flocks with higher titres numerous abortions had occurred recently, associated with *Salmonella abortus-ovis* and *Brucella melitensis* infections. The antigen used in the tests was an American "psittacosis human pneumonitis group antigen".—M.G.G.

Bessmertnykh, A. A. (1960). **[Eradication of swine fever: an urgent task.]**—Veterinariya, Moscow No. 10 pp. 12-15. [In Russian.] **764**

In the U.S.S.R. during 1959, 14 million pigs were inoculated with crystal violet vaccine and during 1957/59 4 million were inoculated with Strain ASV lapinized virus. [Total pig population is about 44 million]. The Rovac strain of virus was found to be too virulent. Well-enforced protective, quarantine and hygienic measures had achieved success in eradicating swine fever from several large areas, including Leningrad, Smolensk, Tula, Rostov and Tambov oblasts and the Krasnodar and Stavropol territories. The state of affairs in other areas (Altai and Primor territories, Saratov and Omsk oblasts) was less satisfactory and much tighter control of swine fever was needed.—R.M.

Lang, R., Leftheriotis, É. & Mackowiak, C. (1960). Multiplication du virus lapinisé de la peste porcine sur cellules de rein de lapin et contrôle de son pouvoir immunigène. **[Multiplication of lapinized swine fever virus in rabbit kidney cells. Immunogenic properties of cultured virus.]** — C.R. Acad. Sci., Paris **251**, 1593-1594. **765**

Pigs resisted challenge with virulent virus 22 days after i/m inj. of Strain SFA of lapinized virus which had been transferred 22 times in tissue culture. The cultured virus caused no reaction when inoculated into pigs. The virus titre that protected half the inoculated pigs was 10^{-5} in 1 ml.—R.M.

Röhrer, H. (1960). Die Leistungen der Schweinepest-Kristallviolettvakzine. **[Performance of crystal violet vaccine against swine fever.]**—Dtsch. tierärztl. Wschr. **67**, 229-233. [Summary in English.] **766**

A review. The vaccine rid severely infected districts of swine fever within a few months when given to all pigs over 8 weeks old, but was unsatisfactory when used only in individual herds in infected districts.—M.G.G.

Fuchs, F. (1960). Weitere Untersuchungen über die Virusausscheidung bei vakzinierten Schweinen nach ihrem Kontakt mit Schweinepestvirus. **[Further studies on excretion of swine fever virus by immunized pigs after contact with the virus.]**—Arch. exp. VetMed. **14**, 984-996. **767**

Seven pigs given 2 doses of crystal violet vaccine 2 weeks apart were infected with swine fever virus by skin scarification 37–144 days after the first immunization. Five excreted the virus for 2–5 days. But of 50 pigs given 3 doses of vaccine, half of which were infected cutaneously and half in the food, only one excreted the virus, in the urine, after oral infection. Sixteen immunized pigs did not excrete the virus in urine or faeces after a second contact infection 7–11 weeks after the first. Virus excreted by immunized pigs was of reduced virulence.—M.G.G.

Anon. (1960). Peste porcine africaine dans la Péninsule Ibérique. **[African swine fever in the Iberian Peninsula.]**—Bull. Off. int. Epiz. **53**, 1146-1149. [In English. pp. 1150-1151.] **768**

The present epidemic of African swine fever in the Iberian Peninsula is being controlled by the "stamping-out" method—destruction of sick and healthy animals on infected farms; disinfection; prohibition of re-stocking, of movement of animals and of the transport of pig meat from infected areas. —M.G.G.

DeTray, D. E. (1960). **African swine fever—an interim report.**—Bull. epiz. Dis. Afr. **8**, 217-223. [Summary in French. Author's summary modified.] **769**

Recent outbreaks of African swine fever in Portugal and Spain have re-emphasized the importance of this disease. Epidemiology, diagnosis and control are discussed. The complex immunological picture gives little hope that a safe and efficient vaccine will be developed in the near future.

Trautwein, G. (1960). Zur Histopathologie und Histochemie der chronischen Viruspneumonie des Schweines. **[Histopathology and histochemistry of chronic virus pneumonia in**

pigs.]—Dtsch. tierärztl. Wschr. **67**, 435-441. [Summary in English.] **770**

Of 82 young pigs, 33 had acute and 49 subacute or chronic pneumonia while of 33 slaughtered pigs 3 had acute and 30 subacute or chronic pneumonia. Thus 79 cases of chronic pneumonia were histologically examined. In two-thirds of these there was peribronchitis accompanied by round-cell infiltration or fibrosis. There was sometimes extensive hyperplasia of peribronchial lymphatic tissue. In the cytoplasm of desquamated alveolar phagocytes there were sometimes coarse droplets and sometimes dense granules. These structures had the staining properties of neutral fat, cholesterol and phospholipids. The presence of poorly absorbable lipids in pneumonia lung tissue might contribute, together with the long persistence of the virus, to the prolongation of inflammatory and proliferative processes, and might prevent complete recovery.—R.M.

Beran, G. W., Wenner, H. A., Werder, A. A. & Underdahl, N. R. (1960). **Enteroviruses of swine. III. Studies on experimental infection in pigs.** — Amer. J. vet. Res. **21**, 723-733. **771**

A strain of porcine enterovirus was given orally or by injection to 28 piglets deprived of colostrum. All of 12 piglets in pens became ill, and 10 died, and of 8 piglets that acquired natural infection after being removed from the dam at birth, 4 died. P.M. examination, however, revealed acute bacterial diseases. Of 16 piglets kept in isolation units, none became ill and no specific P.M. lesions were found, although all had excreted the virus in the faeces. The primary site of viral multiplication was the lower digestive tract, particularly the ileum and colon. The virus was also recovered from the blood of 2 piglets that died. Specific neutralizing antibodies appeared in the serum about 8 days after experimental infection.—M.G.G.

Marshall, V. & Bailey, R. W. (1960). **A "quick" and "clean" method of evaluating canine distemper products.** — Vet. Med. **55**, 45-47. **772**

A method is described to produce uniformity, speed and precision in the evaluation of canine distemper vaccines. When 0·25–0·5 ml. of a 1 : 100 dilution of brain or spleen tissue infected with the Synder-Hill Canine Distemper virus strain is injected obliquely through a hole made by an awl in the skull of anaesthetized dogs about 1 cm. lateral to the midline half-way between the caudal margin of the orbit and the nuchal crest, severe encephalitis develops in 96% of susceptible dogs with death in 94% in 6–8 days.—A. Ackroyd.

Goret, P., Brion, A., Fontaine, M., Pilet, C. & Girard, M. (1960). Echec des essais de prévention et de traitement de la maladie de Carré par le sérum contre la peste bovine. (Note préliminaire.) [**Failure of attempts to prevent and treat distemper with hyperimmune serum against rinderpest.**] — Bull. Acad. vét. Fr. **33**, 343-347. **773**

Injection of hyperimmune serum against rinderpest, prepared in cattle, did not prevent 4 dogs from developing distemper in an infected environment, neither did it protect ferrets against challenge with distemper virus. Of 45 dogs with distemper, 27 recovered after treatment with hyperimmune serum against rinderpest, compared with 9 of 11 treated with serum against distemper, and 2 of 3 treated with normal bovine serum.—M.G.G.

Cabasso, V. J., Avampato, J. E., Kiser, K. H. & Stebbins, M. R. (1960). **Further evidence of immunologic dissimilarity of distemper (CD) and measles (M) viruses.**—Proc. Soc. exp. Biol., N.Y. **104**, 526-529. [Authors' summary modified.] **774**

(1) Ferrets inoculated with repeated doses of MV-adjuvant mixture and which developed M antibodies proved as susceptible as controls to challenge with CDV. (2) Paired convalescent sera from measles patients showed significant measles antibody rises, while CD antibodies remained absent. (3) Growth of MV in HeLa cells was not inhibited by CD immune serum or normal serum, while MV immune serum apparently reduced virus multiplication. Measles immune serum did not interfere with propagation of CDV. (4) By the 14th day after MV infection, serologically negative monkeys developed high antibody titres for MV but none for CDV. It remains to be determined whether these results are attributable to the particular virus strains used, or apply also to other isolates of MV and CDV.

Kunishige, T., Shimizu, Y. & Hirato, K. (1960). **Purification studies on the infectious canine hepatitis virus. I. Viral particles in tissue culture fluid revealed by one purification procedure.** — Jap. J. vet. Res. **8**, 208-

212. [In English. Authors' summary modified.] **775**

Infectious canine hepatitis virus, strain "Matsuda", from dog kidney tissue culture was purified by methanol precipitation, extraction with organic solvents, and differential centrifugation. The virus particle in the purified concentrates was identified by electron microscopy in agar pseudo-replica specimens as a uniform-sized particle 85 mμ (unshadowed preparation), 96 mμ (palladium shadow) in diameter. These particles were associated with viral infectivity. Some of the particles contained a central dense core surrounded by less dense material enclosed in a membrane when unshadowed; when shadowed this central core appeared to be protuberant. [Four plates of photomicrographs.]

Chambers, V. C. & Evans, C. A. (1959). **Canine oral papillomatosis. I. Virus assay and observations on the various stages of the experimental infection.** — Cancer Res. **19,** 1188-1195. **776**

Chambers, V. C., Evans, C. A. & Weiser, R. S. (1960). **Canine oral papillomatosis. II. Immunologic aspects of the disease.**—Ibid. **20,** 1083-1093. [Authors' summaries modified.] **777**

I. The virus was assayed by multiple simultaneous injections of graded doses into the oral mucosa of young dogs. The incubation period was 4–8 weeks in 89 or 90 dogs. The growth period (from first appearance until the first sign of regression) ranged from 4–8 weeks in 37 of 57 dogs and 9–21 weeks in twelve. Time of regression did not appear to be related to size of tumour or length of incubation period, but it was related to the dilution of the infective cell suspension.

II. Subcutaneous and i/m inj. of virus preparations with adjuvants into young dogs 2–3 weeks before inoculation of virus into the oral mucosa prevented development of papillomas.

All areas of the oral mucosa of young dogs were susceptible to infection with the virus; most old dogs were resistant. The titre of virus-neutralizing antibodies in serum from five dogs whose tumours had regressed ranged from 1 : 10 to 1 : 500.

Attempts to accelerate or delay the onset of tumour regression by actively immunizing dogs with tumour extract or living tumour cells gave no clear evidence of significant effect. Injections of immune serum appeared to delay regression. Transfer of lymph-node and spleen cells from recovered dogs to dogs with developing papillomas appeared to hasten regression in 2 of 11 dogs.

Ebner, F. F. & Crandell, R. A. (1960). **Growth of feline viral rhinotracheitis virus in cultures of feline renal cells.**—Proc. Soc. exp. Biol., N.Y. **105,** 153-156. [Authors' summary modified.] **778**

The growth pattern in cultures of feline renal cells of the feline rhinotracheitis virus previously described [*V.B.* **30,** 3268] was investigated. Following an initial period of 18 to 24 hours during which little or no virus could be detected, virus concentration increased steadily until a maximum titre of $10^{-5.5}$ was reached between the 3rd and 4th days. Intranuclear inclusion bodies were demonstrated in infected cells at the time of release of new extracellular virus.

Anon. (1960). **Kyasanur forest disease.** — Lancet, October 29th, 988. **779**

At a meeting of the Royal Society of Tropical Medicine and Hygiene in London on Oct. 20, Dr. Telford H. Work presented a film entitled *Kyasanur Forest Disease in India* and gave a detailed commentary. The disease first appeared in southern India after many deaths had been noticed in December 1955, among monkeys in the Kyasanur forest. The dead monkeys exhibited bleeding from the nose and anus. Monkeys shot in the forest invariably harboured ticks. Human cases of the disease were characterized by very sudden onset, high fever, headache, and great prostration.

The virus belongs to group B of the arthropod-borne viruses and is transmissible by ixodid ticks. A vaccine has now been prepared from it.—R.M.

Iyer, C. G. S., Work, T. H., Narashimha Murthy, D. P., Trapido, H. & Rajagopalan, P. K. (1960). **Kyasanur forest disease. Part VII. Pathological findings in monkeys, Presbytis entellus and Macaca radiata, found dead in the forest.**—Indian J. med. Res. **48,** 276-286. **780**

Twenty-two monkeys were examined. Virus was recovered from blood, liver, spleen, kidney, lung, heart, skeletal muscle and brain of some of them. There were non-specific degenerative changes in the visceral organs. Two had non-purulent encephalitis and 4 others had changes suggestive of encephalitis. Haemorrhages in lungs, kidney and brain were seen in 14 monkeys.—R.M.

Marshall, I. D. & Regnery, D. C. (1960). **Myxomatosis in a Californian brush rabbit (Sylvilagus bachmani).**—Nature, Lond. **188,** 73-74. **781**

Three *S. bachmani* rabbits were trapped in the vicinity of an outbreak of myxomatosis in pet rabbits near San Francisco. A small tumour on the leg of one yielded myxoma virus, which caused typical myxomatosis in a domestic rabbit. All 3 had c.f. antibodies against the virus. It seems that myxomatosis is endemic in wild rabbits in California.

—M.G.G.

Klima, J. & Gratzl, E. (1960). Elektronenmikroskopische Untersuchungen an spontaner und experimenteller Myxomatose der Hauskaninchen. [**Electron microscopy of skin lesions in rabbit myxomatosis.**]—Wien. tierärztl. Mschr. **47,** 425-443. [Summaries in English, French and Italian.] **782**

Structures within epidermal cells and myxoma lesions from 3 infected rabbits were described and illustrated by means of 23 photomicrographs. Evidence of true polymorphism of the virus was presented.—R.M.

Dutcher, R. M., Read, R. B., Jr. & Litsky, W. (1960). **The immunological antigenicity of rapid heat inactivated viruses. I. Newcastle disease virus.** — Avian Diseases **4,** 205-217. [Authors' summary modified.] **783**

A method has been developed utilizing the principle of heating to relatively high temperature (79·4°C.) in short periods of time (0·033 sec.) to inactivate the virus of Newcastle disease. This resulted in a product of apparently high immunological antigenicity.

Four-week-old chicks susceptible to N.D. were inoculated with the inactivated virus suspensions and comparable immune responses were obtained with single and with multiple vaccination and doses ranging from 0·5 to 1 ml. Substantial immune responses were obtained in birds up to 19 weeks following vaccination.

Immunizing potency of the virus suspension was apparently retained following storage for 18 weeks at −25°C. Eighty-four per cent. of all birds challenged from 4 to 7 months after vaccinations were immune to Newcastle disease, while all of the unvaccinated controls were susceptible.

Millen, T. W. (1960). **What makes an H. I. high?**—Poult. Sci. **39,** 1276. [Author's abst. modified.] **784**

Several factors affect the serum haemagglutination inhibition (H.I.) titre of chickens vaccinated with duck-embryo-propagated Newcastle disease virus.

The strain of virus used, method of administration and genetic background of the chickens all contribute.

The virulence of the virus may influence the response of the chicken in overcoming the toxic effect of the virus. Virus strains of low virulence may allow higher titres to develop than found where the bird must neutralize the virus quickly in order to survive. Some chickens can apparently check virulent Newcastle disease virus without developing high H.I. titres.

Virus capable of multiplying to a high haemagglutination titre in embryos is capable of producing high H.I. titres in vaccinated chickens.

Jansen, J. & Kunst, H. (1960). Wederom gevallen van eendenpest. [**Further cases of duck plague.**] — Tijdschr. Diergeneesk. **85,** 1553-1559. **785**

Jansen, J. & Wemmenhove, R. (1960). De pathologie van de eendenpest. [**Pathology of duck plague.**] — Ibid. 1560-1564. [In Dutch. Summaries in English, French and German.] **786**

The fifth recorded outbreak of duck plague in the Netherlands occurred in 1959 in Wageningen. The virus appeared to be less virulent than in previous outbreaks. Clinical and pathological findings were described.

—R.M.

Guillon, J. C. & Renault, L. (1960). Sur l'existence en France de l'hépatite à virus caneton. Note préliminaire. [**Duck virus hepatitis in France.**]—Bull. Acad. vét. Fr. **33,** 238-243. **787**

Hepatitis was observed in January 1960 in the Seine-et-Oise department among 100 newly-hatched ducklings, most of which died before reaching 5 weeks of age. Liver suspension treated with antibiotics was inoculated into the allantois of 20 embryonated hens' eggs. None died but in 4 of 10 that were opened after 8 days the embryo was small and the liver enlarged. Inoculation of chick-embryo material into ducklings has not yet been done, and there was no proof of the existence of a virus similar to that isolated from ducks in other countries.—R.M.

Hitchner, S. B. & Winterfield, R. W. (1960). **Revaccination procedures for infectious**

laryngotracheitis. — Avian Diseases **4,** 291-303. [Authors' summary modified.] **788**

Birds vaccinated against laryngotracheitis in the vent by the brush or drop methods at one, 4 or 8 weeks of age were highly susceptible to injection of virus into the infraorbital sinus at 16 weeks of age.

Revaccination by the vent route (either by drop or by brush method) failed to elicit a "take" reaction and failed to induce the desired secondary antibody response.

Revaccination by dropping vaccine in the eye showed the greatest promise for stimulating increased resistance as revealed by the serological response and protection upon challenge.

Dubose, R. T., Grumbles, L. C. & Flowers, A. I. (1960). **Differentiation of quail bronchitis virus and infectious bronchitis virus by heat stability.**—Amer. J. vet. Res. **21,** 740-743. [Authors' summary modified.] **789**

The heat stability of infectious bronchitis virus (IBV) and quail bronchitis virus (QBV) was compared, and 18 strains of IBV were differentiated from five strains of QBV by this method. None of the IBV strains consistently survived 30 min. at 56°C. Identity of the three most heat-tolerant strains of IBV was confirmed by serum neutralization. All the QBV strains survived heating for 90 min. at 56°C.

Starr, T. J., Pollard, M., Tanami, Y. & Moore, R. W. (1960). **Cytochemical studies with psittacosis virus by fluorescence microscopy.** —Tex. Rep. Biol. Med. **18,** 501-514. **790**

Conventional staining techniques and fluorescence microscopy with acridine orange and fluorescein-tagged antibody were used to study the response of human amnion and human synovial cell lines to infection with psittacosis virus. There are four colour plates of photomicrographs.—R.M.

Isaacs, A. & Baron, S. (1960). **Antiviral action of interferon in embryonic cells.** — Lancet, October 29th, 946-947. [Authors' summary.] **791**

Chorioallantoic membranes from 6-day-old chick embryos were much more resistant to the antiviral action of interferon than tissues from older embryos. Similar differences were found in whole chick and mouse embryo minced tissue, and in this respect the behaviour of early embryonic tissue resembles that of cancer cells. Unlike cancer cells, however, cells from 6-day-old chick embryos showed very weak production of interferon.

Habermann, R. T., Williams, F. P., Jr. & Fite, G. L. (1960). **Inclusion bodies associated with viral diseases of man and other animals.**—J. Amer. vet. med. Ass. **137,** 161-176. **792**

Thirty-four viral diseases of man and animals are listed, that are associated with the formation of intranuclear or cytoplasmic inclusion bodies. P.M. changes in 23 of the diseases are summarized. There are 36 photomicrographs of inclusion bodies.

—M.G.G.

Hemmes, J. H., Winkler, K. C. & Kool, S. M. (1960). **Virus survival as a seasonal factor in influenza and poliomyelitis.** — Nature, Lond. **188,** 430-431. **793**

Assay of influenza virus for up to 2 min. in aerosols revealed that the death rate was low at a relative humidity of 15–40% and high at a r.h. of 50–90%. With poliomyelitis virus the converse was true: a very high death rate at a r.h. below 50%, and a low death rate at 50–90%. The relative humidity indoors is therefore an important factor in these two diseases.—M.G.G.

See also abst. 978 (report, Pasteur Institute, Viet-Nam).

IMMUNITY

Yagi, Y., Engel, K. & Pressman, D. (1960). **Quantitative determinations of small amounts of antibody by use of solid adsorbents.**—J. Immunol. **85,** 375-386. [Part of authors' summary.] **794**

Proteins coupled to polystyrene by azo linkages were used as solid adsorbents for the determination of antibodies to soluble proteins. Studies were carried out quantitatively using I^{131} labelled bovine serum albumin and ovalbumin and their antibodies. Antibodies specifically combined with antigen complexes could be eluted efficiently at pH 3 (citrate buffer) whereas antigens and non-specifically adsorbed proteins remained firmly bound to the resin.

Sutherland, G. B. (1960). **Immunological technique for protein isolation.**—Science **132**, 1252-1253. [Author's abst.] **795**

Carefully coagulated antibody or antigen-antibody complexes may be used as specific adsorbents for antigen, and the antigen may be released subsequently by increasing the acidity. No cross-adsorption appears to take place. The procedure may prove useful for the isolation of tissue-specific proteins (including those in disease states), toxins, or viruses.

Hirata, A. A. & Schechtman, A. M. (1960). **Studies on immunologic depression in chickens.**—J. Immunol. **85**, 230-239. [Part of authors' introduction.] **796**

Depression of the humoral antibody response by means of antigens introduced during the embryonic or neonatal periods has been reported by a number of investigators. The antigens used have included live cells or viruses, killed cells and soluble proteins. On the other hand, some have reported failures. Most of the negative findings have been obtained with chickens. The aim of the present study was to explore some of the possible bases for the apparently contradictory findings in the chicken. The variables examined included developmental stage at which the depressing dose is administered, magnitude of the depressing dose, route of injection and age of the animal at the time of challenge for antibody response. In addition, some observations were made on the specificity of the depressed antibody response.

Steiner, J. W., Langer, B. & Schatz, D. L. (1960). **The local and systemic effects of Freund's adjuvant and its fractions.**—Arch. Path. **70**, 424-434. [Authors' summary modified.] **797**

Disseminated granulomata in lung, liver, kidney, lymph nodes, skeletal muscles, and heart were found in rabbits injected with Freund's adjuvant.

It is suggested that the metastatic localization is initiated by dissemination of the adjuvant by blood and lymph, though a hypersensitivity mechanism may play a role in the subsequent development of the lesions.

Caution was advocated in the interpretation of auto-immune and iso-immune lesions produced in rabbits, hamsters, g.pigs and mice where Freund's adjuvant is used to potentiate the antigenicity of tissue components.

It was suggested that, in accordance with Burnet's theory of clonal selection, the macrophage reactions characterizing the skin and lymph nodal lesions caused by the complete adjuvant is of paramount importance in ensuring a gradual release of antigens to the clones of immunologically competent cells.

See also absts. **604** (staphylococcal agglutinins); **606** (antistaphylococcal activity of human sera and its protective potency); **607-608** (staphylococcal coagulase); **610-611** (anthrax); **612-615 & 619** (TB.); **622** (Johne's disease); **625** (swine erysipelas); **631** (haemorrhagic septicaemia); **646** (brucellosis); **653** (serology of five strains of leptospira); **662** (antibody response in fowls to bacterial antigens); **673** (fluorescent antibody of Sporotrichum schenckii); **675-679** (bovine contagious pleuropneumonia); **687** (PPLO agglutination test); **707** (immunity in calf coccidiosis); **716-734** (F. & M. disease); **735-738** (rabies); **744** (neutralizing antibodies to poliomyelitis in cattle and pigs); **747** (in vitro neutralization test with avian encephalomyelitis virus); **750-751** (equine infectious anaemia); **756** (allergy in rinderpest); **757** (lapinized and avianized rinderpest virus); **762** (diagnosis of ovine virus abortion by the c.f. test); **763** (psittacosis-lymphogranuloma antibodies in sheep); **765-766** (swine fever); **773** (failure of rinderpest serum to protect against distemper); **774** (immunological dissimilarity between distemper and measles viruses); **783-784** (Newcastle disease); **788** (avian laryngotracheitis); **826-828 & 830** (helminths); **847** (Rous sarcoma virus studied with fluorescent antibody).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Rogoff, W. M. & Kohler, P. H. (1960). **Effectiveness of Ruelene applied as localized "pour-on" and as spray for cattle grub control.**—J. econ. Ent. **53**, 814-817. [Authors' abst. modified.] **798**

Ruelene was applied to cattle for the control of *Hypoderma lineatum* and *H. bovis*. Applications were made by high pressure spray at 0·25% concentration, and by a localized "pour-on" technique utilizing a long-handled dipper to discharge 100 ml. of concentrated emulsion on the back of each animal. A group of 49 calves treated by the "pour-on" technique demonstrated 96% to 98% reduction and another 14 calves treated at a 10 ml. dosage showed 85% to 88% reduction; 14 calves treated with 20 ml. showed 98% reduction and 9 calves treated with 40 ml. showed 100% reduction in the number of grubs present as compared with untreated controls. Some mild skin irritation was seen in some dairy cattle, but not in Hereford cattle.

Harvey, T. L. & Brethour, J. R. (1960). **Feed additives for control of house fly larvae in livestock feces.**—J. econ. Ent. **53**, 774-776. [Authors' abst. modified.] **799**

There was no reduction in the numbers of *Musca domestica* completing development from egg to adult in faeces from a steer fed up to 100 g./day of Polybor 3, (disodium

octoborate tetrahydrate). When mixed directly with cattle dung, Polybor 3 was an effective larvicide; a possible explanation for relatively higher rates in a steer ration not controlling larvae in faeces is discussed. A preparation of *Bacillus thuringiensis* containing 25×10^9 spores/g. mixed directly with cattle faeces at rates of 0, 50, 100, 200, and 300 mg./kg. and inoculated with 100 house fly eggs resulted in an average of 43, 41, 9, 5, and 0 adult house flies completing development, respectively. Feeding 20 g. *B. thuringiensis* daily to a steer prevented development of house flies in dung, and 0·125 g. *B. thuringiensis*/kg. ration greatly reduced the number of adult flies emerging from hen droppings. The presence of chlortetracycline did not decrease the effectiveness of this pathogen. [See also *V.B.* **30**, 2595].

Clifford, C. M. & Anastos, G. (1960). **The use of chaetotaxy in the identification of larval ticks (Acarina: Ixodidae).**—J. Parasit. **46**, 567-578. [Authors' summary modified.] **800**

Larvae of 56 species of ixodid ticks were examined and information concerning 25 species from the U.S.S.R. was obtained.

The study of chaetotaxy showed that setae were of definite value for the identification of genera and species. Features having the greatest value include the number of setae on various parts of the body, the distribution of setae on certain parts of the body, the positional relationship of the setae to certain body structures and to other setae, also the length and the nature of the setae.

Keys to genera of larval ticks of the world and to species of larval ticks of the genus *Ixodes* in the eastern States of the U.S.A. are included to demonstrate that sufficient characters are now available to separate larvae in a wide geographical area.

Drummond, R. O., Moore, B. & Wrich, M. J. (1960). **Field tests with insecticides for control of lone star ticks on cattle.** — J. econ. Ent. **53**, 953-955. [Authors' abst. modified.] **801**

In 1958 and 1959 cattle were sprayed with 11 insecticides to control *Amblyomma americanum*. The considerable variation in effectiveness of the standard, 0·5% toxaphene, at 1 week after treatment was dependent upon the intensity of re-infestation. One week after treatment 0·5% Co-Ral was most effective; 0·5% toxaphene, 0·75% ronnel, and 0·5% malathion afforded equal protection; and 0·025% lindane was the least effective of these recommended sprays. Of the newer compounds tested, 0·15% Delnav and 0·5% Sevin afforded greater reductions than toxaphene; 0·5% Bayer 22408 was as effective as the standard; and dicapthon, Dipterex and Ruelene gave least reductions. None of the treatments was effective after 2 weeks.

Hughes, C. A. & Iwan, L. G. R. (1960). El hallazgo del Psorergates ovis Womersley 1941, como ectoparasito de lanares Merino en la Patagonia. [**Psorergates ovis on Merino sheep in Argentina.**] — Rev. Med. vet., B. Aires **41**, 19-29. [Summary in English.] **802**

Investigations in sheep flocks indicated that *Ps. ovis* infestation is widespread in southern Argentina. Symptoms were often masked by concurrent *Psoroptes* infestation. A characteristic of infested sheep was the fragility of the skin.—M.G.G.

Rodriguez, J. L., Jr. & Riehl, L. A. (1960). **Control of northern fowl mite in community wire cages with malathion in special dust-bath-boxes.**—J. econ. Ent. **53**, 701-704. **803**

Hens housed in groups of between 70 and 100 in wire cages were effectively treated for *Ornithonyssus sylviarum* infestation by placing in the cage a box (45 × 30 cm. square and 8 or 16 cm. deep) charged with between 0·5 and 2 kg. of 4% malathion dust.—R.M.

Roberts, R. H., Radeleff, R. D. & Wheeler, H. G. (1960). **Malathion residues in the tissues of sheep, goats, and hogs.**—J. econ. Ent. **53**, 972-973. **804**

The animals were sprayed with 1% emulsion. Any malathion absorbed was rapidly excreted within a week. The lack of residues from the 1% sprays suggested that there was even less hazard from the 0·5% concentration.—R.M.

See also absts. **882** (diseases and parasites of mink); **971** (parasites of monkeys).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Dorsman, W. (1960). **The diagnosis of subclinical fascioliasis by means of faecal examination, and the control of liver flukes (Fasciola hepatica).** — Bull. Off. int. Epiz. **54**, May pp. 502-508. [In English. Summary in French.] **805**

Subclinical fascioliasis in cattle was diagnosed by examining faecal samples taken

between 11 a.m. and 3 p.m. This period was chosen because there is a diurnal periodicity in egg production [see *V.B.* **28,** 1135]. Dosing cattle and sheep with hexachlorophene was suggested to be a better and cheaper method of eradicating liver fluke than the control of snails, but the fate of the drug in animals must be studied first.—M.G.G.

Wikerhauser, T. (1960). **A rapid method for determining the viability of Fasciola hepatica metacercariae.**—Amer. J. vet. Res. **21,** 895-897. [Author's summary modified.] **806**

Active excystation of viable metacercariae was induced by treating them first with pepsin solution (0·5 g. of pepsin, activity 1 : 3,000 U.S.P.; 0·8 g. of NaCl; and 100 ml. of N/20 HCl) for 2–3 hours and then with trypsin solution (0·4 g. of trypsin, activity 1 : 250 U.S.P.; 0·8 g. of NaCl; 1·0 g. of $NaHCO_3$; and 100 ml. of distilled water) supplemented with 20% ox bile for an additional 2–3 hours. By replacing the digestive medium with Tyrode's solution, the survival of excysted metacercariae was readily prolonged to 42 hours.

Enigk, K. & Düwel, D. (1960). Die Durchführung der Bekämpfung der Leberegelschnecke Galba truncatula (Limnaeidae). **[Destruction of the liver-fluke snail.]**—Mh. Tierheilk. **12,** 259-280. **807**

Since 1956, over 5,000 hectares of pasture in West Germany have been treated with sodium pentachlorophenate. When all the habitats of snails are sprayed—watercourses, and areas of pastures or whole pastures which have poor drainage or are flooded periodically—and precautions are taken to prevent re-infestation—fencing of dangerous areas, provision of clean drinking water in troughs, prevention of flooding and irrigation with water from ditches, avoidance of new hay from untreated meadows—eradication of liver fluke infestation for at least 5 years can be expected. [See also *V.B.* **27,** 1810.]—M.G.G.

Lienert, E. (1960). Die durch Hexachloräthan erzielbare tödliche Wirkung auf den grossen Leberegel (Fasciola hepatica L.) wird durch das Blut des Wirtes vermittelt. **[Blood of the host as the source from which liver flukes derive lethal amounts of hexachloroethane.]** —Wien. tierärztl. Mschr. **47,** 444-450. [Summaries in English, French and Italian.] **808**

Of 145 liver flukes implanted s/c in rats given a single oral dose of 195, 800 or 1,231 mg. of hexachloroethane per kg. body wt. at the time of implantation, 22–72% were dead 5 days later, compared with 0–53% of 149 flukes in untreated rats.—M.G.G.

I. Behrens, H. (1960). Behandlung des Leberegelbefalls der Schafe mit Hetol. **[Treatment of fascioliasis in sheep with "Hetol", bis(trichloromethyl)benzene.]** —Dtsch. tierärztl. Wschr. **67,** 467-470. [Summary in English.] **809**

II. Enigk, K. & Düwel, D. (1960). Die Behandlung der Fasciolose beim Rind mit "Hetol". **[Treatment of fascioliasis in cattle with "Hetol", bis(trichloromethyl)benzene.]** —Ibid. 535-539. [Summary in English.] **810**

I. Thirteen flocks of 3,375 sheep with fascioliasis were treated by mouth with "Hetol", containing 85% bis (trichloromethyl) benzene. The dose was 50 ml. of aqueous suspension (500 g. "Hetol" in 2½ litres) for adults and 25–50 ml. for lambs over 4 months old. Faeces taken from 10–20 animals in each flock 4 and 8 weeks later contained no or very few ova. In one flock, the decline in egg count after 4 weeks was 96% in 20 sheep given "Hetol", compared with 77% in 40 sheep treated with hexachloroethane. Five of 460 sheep feeding in harvested sugar-beet fields died after treatment with "Hetol", otherwise there were no side effects.

II. Between September and November 283 cattle with fascioliasis were given by mouth 8 g. of "Hetol" per 50 kg. body wt., with a maximum dose of 80 g. Faecal examination 6 weeks after treatment revealed that 26% were free from infestation, 70% were slightly infested, and 4% moderately so. Of 29 slaughtered about 3 weeks after treatment, 16 were free from liver flukes. Better results were obtained in 581 cattle treated between the end of January and the end of March, when 75% no longer excreted ova up to 8 weeks after treatment, 22% a few, and 3% a moderate number. Of 20 cattle slaughtered after 7–20 days, 18 had no liver flukes. The poorer results in the autumn trial were ascribed to the lack of action on immature flukes. A dose 1½ times the normal was tolerated, but side effects were seen in 60–70% of cattle fed on beet or cabbage.

—M.G.G.

Khanbegyan, R. A. (1960). **[Combined use of hexachloroethane and carbon tetrachloride against liver fluke in sheep.]**—Veterinariya, Moscow No. 6 pp. 34-37. [In Russian.] **811**

Laboratory and field trials of different

combinations and routes of administration showed that the best was oral administration of 0·2 g./kg. body wt. hexachloroethane with a total dose of 1 ml. carbon tetrachloride. The passing of fluke eggs in the faeces stopped 3–4 days after treatment.—R.M.

Strehl, W. (1960). Versuche zur lokalen und allgemeinen Verträglichkeit von parenteral verabreichtem Hexachlorophen und Tetrachlorkohlenstoff (in Form von Ecobol) bei der Leberegelkrankheit der Schafe und Rinder. **[Local and general reaction to hexachlorophene and carbon tetrachloride administered parenterally to sheep and cattle.]**—Inaug. Diss., Munich pp. 60. **812**

Of 7 sheep given s/c 15–30 mg./kg. of hexachlorophene, only one had a local reaction. Of 8 cattle injected s/c and one i/m with 15 mg./kg., all had local reactions, and general symptoms were seen in the one treated i/m. Blood picture and blood serum content of Ca, K and Na were unaltered. Two of 13 sheep given s/c 4–8 ml./10 kg. of carbon tetrachloride developed local reactions. Of 11 cattle each given i/m 20–40 ml., one developed a local reaction and in another appetite was reduced. Pain from i/m inj. was prevented by adding a local anaesthetic. Leucocytes and serum Ca decreased slightly on the first day after inj. of carbon tetrachloride. Living flukes were found 2 months after treatment in one of 3 cattle but not in 4 sheep given hexachlorophene. No muscle damage was found at the site of injection in 3 cattle slaughtered 3–9 days after treatment with carbon tetrachloride. But gelatinous infiltration was found after 14 days in the ox inj. i/m with hexachlorophene.—M.G.G.

Froyd, G. (1960). **The incidence of liver flukes (Fasciola gigantica) and hydatid cysts (Echinococcus granulosus) in Kenya cattle.** — J. Parasit. **46**, 659-662. [Author's summary modified.] **813**

A survey on 1,000 slaughter cattle showed that about 34% had flukes and 30% had hydatids.

An interference between the two parasites occurred only in the liver, *i.e.*, the one lowered the incidence of the other, but liver fluke was not affected by the presence of lung hydatids.

The ratio of lung to liver infections with hydatids corresponded closely with a previous survey [*V.B.* **30**, 3952].

Sinha, P. K. & Srivastava, H. D. (1960). **Studies on Schistosoma incognitum Chandler, 1926. II. On the life history of the blood fluke.** — J. Parasit. **46**, 629-641. [Authors' summary modified. For Part I see V.B. **26**, 3846.] **814**

The life cycle of this common blood fluke of pigs in India was studied, including development of the embryo, hatching of the egg, movements and morphology of the miracidium and its penetration of the snail host, larval development within the molluscan host, movements and morphology of the cercaria, and penetration of the cercaria into the definitive host and its development into adult.

Pearson, J. C. (1960). **New records of trematodes from the cat.**—Aust. vet. J. **36**, 93. **815**

Five species of heterophyid trematodes were found in cats from Brisbane. They are *Stictodora caballeroi, Stellantchasmus falcatus, Procerovum sp., Haplorchis yokogawai, Haplorchis* sp. The cat is not considered to be the normal host as these species occur also in birds and rats. Other trematodes were found in wild animals which may also infest cats and dogs.—H. McL. Gordon.

Yasarol, S. (1960). L'hydatidose-echinococcose en Turquie. **[Hydatid disease in Turkey.]**—Bull. Off. int. Epiz. **54**, May pp. 492-501. **816**

In Turkey, hydatid disease was found in 0·5% of 52,710 human patients and P.M. specimens, and in 50% of slaughtered sheep and cattle. The multilocular type was rare, although not confined to certain regions. In sheep and cattle, the liver was infested in 70%, and the lungs in 30%. *Echinococcus granulosus* was found in 2 of 350 dogs in Istanbul and in 2 of 31 dogs in Ankara.

—M.G.G.

Ginanni, C. (1960). Profilassi contro l'idatidosi attuata nel comune di Torino. **[Control of hydatid disease in Turin, Italy.]** — Progr. vet., Torino **15**, 461-464; 466 & 468. **817**

An account of a mobile service for disinfestation of dogs on the owners' premises.—T.E.G.R.

Dewhirst, L. W., Trautman, R. J., Pistor, W. J. & Reed, R. E. (1960). **Studies on ante-mortem diagnostic procedures in bovine cysticercosis infections.**—J. Parasit. **46**, No. 5 Sect. 2 pp. 10-11. [Authors' abst. modified.] **818**

Weekly haematological and immunological studies were conducted on artificially infected cattle. The haemoglobin content of blood dropped from an average of 9·8 g. per

100 ml. to an average of 6·5 (12 weeks after infection) and then rose to an average of 8·5 by the time the animals were slaughtered (24 weeks after infection). This cycle was also reflected in the packed cell volume. Other haematological studies revealed little or no change. Positive reactions to precipitin tests on serum were detected at the sixth week after infection and persisted with some variability until the animals were slaughtered. Some reactions were positive with an antigen dilution of 1 : 16,000.

Skin tests were conducted between 5 and 8 weeks after infection. Reactions were read at 30 min., 1 hour, and 24 hours after i/d inj. of antigen. Maximum reactions were evident at 30 minutes. Weals ranged from 1 to 4 cm. in size in the first test and from 6 to 18 cm. in the second test.

Skin tests were also conducted on 499 cattle suspected of being infected. Of these, 69 were considered positive and 430 as negative. When slaughtered, none of the 430 classed as negative were found to harbour tapeworm cysts. In the "positive" group, only four contained viable cysticerci but most of the others harboured old calcified cysts.

McManus, D. (1960). **Prenatal infection of calves with Cysticercus bovis.**—Vet. Rec. **72,** 847-848. **819**

In Kenya, cysticerci were found in 457 (3%) of 14,855 slaughtered calves, 80% of which were under 3 weeks old. Prenatal infection was assumed in calves aged up to 10 days. Predilection sites were, in order of importance, shoulder, tongue, heart, and masseter muscles.—M.G.G.

Castel, P., Graber, M., Gras, G. & Chhay-Hancheng. (1960). Action de l'arséniate d'étain sur divers cestodes du mouton. [**Tin arsenate as an anthelmintic for tapeworms in sheep.**]—Rev. Élev. **13,** 57-74. [Summaries in English and Spanish.] **820**

A single dose of 250 mg. of tin arsenate given in capsule form rid sheep of all *Moniezia expansa* and *M. benedeni,* and 350 mg. rid sheep in addition of all *Avitellina centripunctata, A. woodlandi* and *Stilesia globipunctata,* but had no effect on *S. hepatica.* With the larger dose, deprivation of food and water for 20 hours before and 4 hours after treatment was necessary, to limit formation of soluble arsenic in the digestive tract. With the smaller dose, water should be withheld for 12 hours before and 4 hours after treatment. The lethal dose was 2·25 g. The muscle of sheep slaughtered 6 days after dosing with 350 mg. was free from arsenic. Of the organs, only the spleen and intestine contained more than 0·1 mg./kg.—M.G.G.

Turner, J. H., Shalkop, W. T. & Wilson, G. I. (1960). **Experimental strongyloidiasis in sheep and goats. IV. Migration of Strongyloides papillosus in lambs and accompanying pathologic changes following percutaneous infection.**—Amer. J. vet. Res. **21,** 536-546. [For previous parts see V.B. **29,** 2864 & 3523; **30,** 178.] **821**

This paper gives details of work previously reported in brief [*V.B.* **29,** 126].
—R.M.

Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M. & Sharp, N. C. C. (1960). **Resistance to Trichostrongylus colubriformis produced by X-irradiated larvae.**—Vet. Rec. **72,** 884. **822**

Administration to lambs of *T. colubriformis* larvae irradiated with X-rays (40,000 r) produced an immune response capable of giving good protection. However the X-ray dosage needs to be higher as the worms developed to the adult stage although they were mainly non egg-laying females.
—B. M. Wilson.

Turner, J. H. & Wilson, G. I. (1960). **The effect of three different exposures to parasitism on the serum proteins of Shropshire lambs.**—J. Parasit. **46,** No. 5 Sect. 2 pp. 29. [Authors' abst. modified.] **823**

Lambs of one group (Group 1) were taken from the ewes at birth and reared in a helminth-free isolation building; they acquired only light coccidial infections. Lambs of Group 2 were maintained in concrete-floored pens and acquired minimal infections of *Strongyloides papillosus* and various coccidia. Lambs of Group 3 were reared with the ewes on pasture and were exposed to relatively heavy parasitic infection with various trichostrongyles, *Oesophagostomum* spp., and *S. papillosus.* All groups after weaning were fed mixed grain; Groups 1 and 2 received lucerne hay instead of green forage.

Average gamma globulin percentages were relatively constant in lambs of the isolation and barn groups throughout the period studied.

In the pasture group (Group 3) the gamma globulin percentage rose steadily after the fourth month to a maximum when the study was completed.

Average albumin to globulin ratios (A/G) declined steadily in lambs of the heavily parasitized pasture group but increased steadily in the other two groups. Average terminal A/G ratios were 3·2, 2·4, and 0·4 for Groups 1, 2 and 3 respectively.

Diamond, L. S. & Douvres, F. W. (1960). **Cultivation of parasitic stages of the swine nematodes Hyostrongylus rubidus and Oesophagostomum quadrispinulatum (O. longicaudum) free of microbial associates.** — J. Parasit. **46**, No. 5 Sect. 2 p. 25. [Authors' abst. modified.] **824**

Eight to 9-day-old infective third-stage larvae of *H. rubidus* and *Oe. quadrispinulatum* were isolated from sphagnum-moss cultures seeded with faeces of infected pigs. After the larvae were exsheathed by hypochlorite treatment, they were introduced into a medium that contained principally trypticase, yeast extract, glucose, sheep serum, and extracts of rabbit embryo and pig liver. Bacterial and fungal associates that survived hypochlorite treatment were eliminated by the use of penicillin, streptomycin, and mycostatin.

Within 42 days' incubation at 38·5°C., *H. rubidus* reached the fourth moult and *Oe. quadrispinulatum* the fourth stage. This interval was considerably longer than that required for comparable development in pigs. Additional differences observed included stunted development from the fourth stage onward of cultured larvae and failure of the genital primordium of *H. rubidus* to keep pace with somatic differentiation.

Eckert, J. (1960). Die Diagnose des Magen-Darmstrongylidenbefalles des Schafes durch Differenzierung der freilebenden dritten Larven. [**Diagnosis of stomach worms in sheep by differentiation of the free-living third stage larvae.**]—Zbl. VetMed. **7**, 612-630. [Summaries in English, French and Spanish.] **825**

With two exceptions, all third stage larvae of sheep stomach and intestinal worms can be differentiated morphologically. But *Ostertagia* can be distinguished from *Trichostrongylus*, and *Chabertia ovina* from *Oesophagostomum venulosum* only by size.

—M.G.G.

Lucker, J. T. & Vegors, H. H. (1960). **Immunization against the cattle lungworm: an experiment on the use of larvae attenuated by exposure to X-rays.**—J. Parasit. **46**, No. 5 Sect. 2 p. 39. **826**

British workers found that oral administration of 4,000 X-irradiated infective-stage larvae of *Dictyocaulus viviparus* almost completely immunized calves. The X-ray dosage was 40,000 r and the challenge exposure was to 4,000 normal larvae 8 weeks after vaccination.

In the authors' experiment, calves were similarly vaccinated with larvae exposed to this same X-ray dosage and upon more severe and later challenge were as susceptible to *D. viviparus* infection as controls. The challenge exposure was 15,000 larvae 18 weeks after vaccination.—R.M.

Cornwell, R. L. & Michel, J. F. (1960). **The complement fixing antibody response of calves to Dictyocaulus viviparus. I. Exposure to natural and experimental infection.** — J. comp. Path. **70**, 482-493. **827**

Cornwell, R. L. (1960). **The complement-fixing antibody response of calves to Dictyocaulus viviparus. II. Vaccination with irradiated larvae. III. Vaccinated calves exposed to challenge.** — Ibid. 494-498 & 499-513. [Authors' conclusions modified.] **828**

I. C.f. tests using a heated adult worm antigen were carried out on the sera of 6 calves infected indoors with a single dose of *D. viviparus* larvae, one calf given multiple doses of larvae indoors and 24 calves exposed to infection at pasture. Faecal larval counts, herbage counts and P.M. worm counts were made. There was little difference between the indoor and outdoor infections in the time of onset of the antibody response or the time taken to reach a peak. The time elapsing was 35 days in onset and 76 days to the peak for the indoor calves and 31 and 79 days for the outdoor calves. In the presence of a continuous herbage infestation the titre remains in the middle range after falling from the peak. Should the herbage infestation cease or the calf be removed from the pasture the titre falls to a low level, but on re-exposure to infection a secondary response occurs in 7 days, reaching a peak in 21 to 28 days. One calf given repeated doses of larvae at intervals of 6 to 10 weeks, did not show a true secondary response and its titre declined to a low level despite the repeated infections. It is suggested that a secondary response can occur when worms become established in the lungs of an animal which has previously been infected but has either not acquired full protection or, in the absence of re-infection, has lost it. The entirely refractory calf gives no

such response because no parasites become established.

II. The antibody response of 32 calves vaccinated with a double dose of irradiated *D. viviparus* larval vaccine was measured by the c.f. test, using a whole worm antigen. Titres resulting from the first dose were low, while the second produced a variable rise in titre and at the time of going out to grass 4 to 5 weeks later the antibody levels were in the low or middle range. Individual calves showed a wide variation in response and in 3 calves no antibodies were produced by either dose.

III. The antibody response of 19 calves vaccinated with a double dose of irradiated *D. viviparus* larvae and subsequently exposed to challenge was measured by the c.f. test. The challenge stimulated an early rise in titre or a continuation of the rise produced by vaccination. In the calves challenged at grass, the titre reached a peak and continued high as long as the pasture remained infected, but commenced to fall at the end of the season when the pastures were bare, and continued to fall after housing.

In two calves challenged indoors with 10,000 larvae the titre rose to a peak and fell almost as quickly. Later exposure at grass stimulated a secondary response. These peaks of antibody response coincided with a rise in respiratory rate.

The effectiveness of the vaccine was assessed. One calf exposed to a very heavy field infection died in the prepatent stage although its titre showed a marked secondary response. The two calves challenged indoors with 10,000 larvae showed moderate symptoms and lost weight. Calves exposed to an estimated moderate degree of infection at pasture showed mild symptoms and passed few larvae in the faeces. One exception occurred in this group, the calf dying while passing 212 larvae per g. and having 860 worms in the lungs.

There is some evidence that those calves whose vaccinal titres are low or absent and do not rise as quickly as in a true secondary response are less resistant to challenge.

It is suggested that the development of immunity depends upon the establishment of irradiated larvae in the lungs.

Rose, J. H. (1960). **Experiments on the transmission of cattle lungworm infection.** — J. comp. Path. **70**, 475-481. [Author's conclusions modified.] **829**

From experiments to determine the relative importance of climatic conditions, the distribution of faeces over the herbage and the grazing behaviour of cattle in relation to the transmission of lungworm infection, climatic conditions were considered the most important, but under certain conditions the other factors had an appreciable effect on transmission.

Tromba, F. G. & Baisden, L. A. (1960). **Diagnosis of experimental stephanuriasis in swine by a double diffusion agar precipitin technique.**—J. Parasit. **46**, No. 5 Sect. 2 p. 29. [Authors' abst. modified.] **830**

A diagnostic technique utilizing the micro-Ouchterlony methods of Wadsworth (1957) and Crowle (1958) has been developed. Sera obtained from pigs 4 to 14 weeks after infection with kidney worms contained antibodies which formed precipitates with antigens prepared from juvenile and adult kidney worms. The position and shape of the specific precipitin lines were constant throughout this period, although some variation in number was observed between sera.

Sera of pigs experimentally infected with seven other helminths were tested against kidney-worm antigens. In all cases precipitin lines formed but differences in their position and shape makes them readily distinguishable from lines formed in the homologous system.

Brody, G. & Wuest, E. C. (1960). **Activity of dithiazanine iodide administered in feed against larval infections of Ascaris suum in young pigs.**—J. Parasit. **46**, No. 5 Sect. 2 p. 9. **831**

Dithiazanine iodide at 0·04% in feed exhibited definite activity against migrating larvae as indicated by prevention of "thumping," prevention of depression of rate of feed intake following infection and by the absence of larvae in the small intestine. Liver lesions resulting from the migration of larvae were not prevented by dithiazanine.

Nickel, E.-A. (1960). Untersuchungen über Verlauf und Auswirkungen experimenteller Spulwurminfektionen bei Läufer- und Mastschweinen. [**Effect of experimental Ascaris infestation on growth of young pigs.**]—Berl. Münch. tierärztl. Wschr. **73**, 265-270. [Summary in English.] **832**

Five litters from worm-free sows were each infected (except some controls in each litter) with embryonated eggs of *A. lumbricoides* when they weighed between 20 and 25 kg. and were slaughtered when they

reached 90–100 kg. After administration of 50,000 eggs very few or even none of the eggs developed into adult worms living in the intestine, and infection had little or no lasting effect on weight gain, although it did cause a few days' illness with loss of appetite. In pigs given smaller doses (13,000–27,000 eggs), more worms reached maturity (49 in one, 65 in another) and the average daily weight gain was less than that of uninfected litter mates.
—R.M.

Fitzgerald, P. R. (1960). **The pathology occurring in lambs as a result of inoculation with embryonated eggs of Ascaris lumbricoides var. suum.** — J. Parasit. **46,** No. 5 Sect. 2 p. 30. [Author's abst. modified.] **833**

Larval migration and the development of the immature stages were the same as in other experimental animals. No adult worms were recovered. Dyspnoea and reduced appetite were observed between 4 and 8 days after inoculation. In one lamb a maximum temperature of 106·9°F. was observed 8 days after inoculation; another died on the 8th day when third-stage larvae were most abundant in the lungs.

No consistent changes were observed in haemoglobin, packed cell volume, or total white cells. The eosinophile-neutrophile ratio began to change 8 days after inoculation; in one animal, the proportion of eosinophiles reached 23%, and there was concurrent decline of neutrophiles to 15%. Gross lesions were observed chiefly in the liver and lungs. Swelling and severe petechial and ecchymotic haemorrhages occurred in the lungs in animals examined on the fourth and eighth days. In animals examined 16 days or more after inoculation, there were no gross lesions.

Microscopic examination of lung tissues revealed congestion and haemorrhage, infiltration with lymphoid and plasma cells, and some desquamation of the bronchiolar epithelium. The liver most frequently showed congestion, fatty change with infiltration by polymorphonuclear leucocytes.

Schaeffler, W. F. (1960). **Experimental infection of sheep with the dog ascarid, Toxocara canis.**—J. Parasit. **46,** No. 5 Sect. 2 p. 17. [Author's abst. modified.] **834**

Eight yearling sheep and 10 lambs (2 to 10 days old) were fed 4,000 to 216,000 infective *T. canis* eggs. They were killed after 2 days to 12 weeks and examined for gross and microscopic lesions. Their mesenteric lymph nodes, organs and skeletal muscles were examined for larvae by digestion with artificial gastric juice and by allowing the larvae to migrate into physiological salt solution.

The only significant blood change following infection was high eosinophilia. The migratory pattern of the larvae was definitely influenced by the age of the hosts. In yearlings hardly any migration took place beyond the liver. In very young lambs the mesenteric lymph nodes, pancreas, heart, lungs, kidneys, brain, and the shoulder and thigh muscles were invaded as early as 4 days after infection.

The larvae remained alive without apparent diminution in numbers for the entire observation period (12 weeks in the yearlings and 8 weeks in the lambs). They remained in the second stage and did not increase in size. The average length of 225 larvae was 425 μ and their average width 22 μ.

No clinical signs attributable to infection were observed. Lesions in the intestinal lymph nodes, liver, and lungs consisted of haemorrhages, infiltration with mononuclear cells, neutrophiles and especially with eosinophiles, and focal necrosis. There were hardly any cellular changes around larvae migrating actively in the brain and other organs.

Hong-Fang Lee. (1960). **Effects of superinfection on the behaviour of Toxocara canis larvae in mice.** — J. Parasit. **46,** 583-588. [Author's summary modified.] **835**

Each mouse in 4 groups was infected with 2,000 *Toxocara canis* larvae given in 3, 4, 5, or 6 spaced inoculations over a period of 6 weeks and was killed 8 weeks after the first inoculation. In 2 control groups mice were given one or two thousand larvae in single inoculations, and they were killed 2 or 8 weeks later. While all the test animals survived, 3 in the control group died. In the superinfected mice the number of larvae recovered from various organs was about one-fifth of the number recovered from the control groups. Super-infection had no apparent effect on the extent of encapsulation but did increase the relative number of encapsulated larvae in the liver.

Siegmann, O. & von Bülow, V. (1960). Weitere Untersuchungen über die Eignung von Hygromycin B zur Bekämpfung von Geflügelhelminthen. **[Hygromycin B for the control**

of helminth parasites in poultry.] — Dtsch. tierärztl. Wschr. **67,** 470-474. [Summary in English.] **836**

Chicks fed "Hygromix" [see *V.B.* **29,** 2870] as 0·5% of the ration for 8 weeks converted food less efficiently than controls. Higher dosages depressed growth. It did not affect the development of the laying organs of pullets fed 1% for 6 months. As 1% of the ration, its effect on experimental *Davainea proglottina* infestation was unsatisfactory. —M.G.G.

See also absts. **882** (diseases and parasites of mink); **971** (parasites of monkeys).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Cotchin, E. (1960). **Tumours of farm animals: A survey of tumours examined at the Royal Veterinary College, London, during 1950-60.** —Vet. Rec. **72,** 816-822 & 823. [Author's summary modified.] **837**

The 452 tumours included 90 from horses, 293 from cattle, 38 from sheep, 27 from pigs, and 4 from goats. A comparative account is given of the tumours in the various body systems of the species concerned. The important tumours were: in the horse—melanomas and fibromas of the skin, and carcinoma of the penis; in the ox—melanomas, fibromas and warts of the skin, "eye cancers", lymphosarcomas, fibropapillomas of the penis, and vaginal tumours; in the sheep—lymphosarcomas and liver tumours; in the pig—lymphosarcomas and embryonal nephromas. Three of the 4 tumours from goats were lymphosarcomas. The importance of lymphosarcoma as a "wide-range" tumour is again illustrated.

Schenker, H. & Kronberger, H. (1960). Melanom der Haut eines Rindes. **[Melanoma of the skin in a cow.]**—Berl. Münch. tierärztl. Wschr. **73,** 209-211. [Summary in English.] **838**

A pedunculated tumour hanging from the neck of a cow aged 11 years weighed 18·3 kg. It was present as a lump the size of a pea during calfhood. It was removed surgically. —R.M.

I. Sternberg, S. S., Popper, H., Oser, B. L. & Oser, M. (1960). **Gallbladder and bile duct adenocarcinomas in dogs after long term feeding of Aramite.** — Cancer, Philad. **13,** 780-789. **839**

II. Popper, H., Sternberg, S. S., Oser, B. L. & Oser, M. (1960). **The carcinogenic effect of Aramite on rats. A study of hepatic nodules.** —Ibid. 1035-1046. **840**

I. An illustrated account of work previously published in brief [*V.B.* **29,** 3894].

II. In addition to liver carcinoma [*V.B.* **30,** 3708] this parasiticide when fed for 2 years at 100, 200 or 400 p.p.m. in the food appeared to cause the formation of more non-malignant hyperplastic nodules than were found in normal rats aged two years.—R.M.

Grant, C. A. (1960). **Pancreatic insuloma with clinical manifestations in a dog.**—J. comp. Path. **70,** 450-456. [Author's conclusions modified.] **841**

A non-metastasizing pancreatic insuloma in an 8-year-old Boxer bitch is described. Cytoplasmic granules tinctorially resembling those of β-cells were demonstrated in some tumour cells; otherwise there was widespread and pronounced hydropic degeneration throughout the tumour. Although there was no opportunity to determine the blood glucose level during life, the history of recurring episodes of unconsciousness, a common sign of hypoglycaemia induced by release of insulin from these tumours, was taken as evidence that the tumour was active.

Most of the 14 canine pancreatic insulomas which have been described previously were active; about half had metastasized when detected. Neither the duration of clinical signs nor blood glucose levels appear to be reliable guides for estimating the presence or absence of metastases and consequently the suitability of these tumours for surgical treatment.

Brodey, R. S. & Morris, A. L. (1960). **Odontoma associated with an undifferentiated carcinoma in the maxilla of a dog.**—J. Amer. vet. med. Ass. **137,** 553-559. [Authors' summary modified.] **842**

A complex composite odontoma developed in the maxilla of a Dalmatian dog aged 10 months. Four years later there was little radiographic evidence of change in the tumour but a rapidly progressing, undifferentiated carcinoma was observed both grossly and microscopically to be in direct association with the odontoma. It was not

possible to determine from what cell type the carcinoma originated or whether it developed independently of the odontoma.

Labie, C. & Fontaine, M. (1960). Mastocytome splénique du chat. **[Mastocytoma of the spleen in three cats.]**—Bull. Acad. vét. Fr. **33**, 361-366. **843**

These tumours give rise to enlargement of the abdomen and vomiting. Diagnosis was made by puncture of the spleen through the left side. Temporary decrease in spleen volume was achieved in one cat by injecting 0·1 mg. adrenochrome monosemicarbazone (carbazochrome) three times daily. Splenectomy was done in the two other cats. The cats were 4, 5 and 7 years old.—R.M.

Sträuli, P. (1960). Über ein spontanes transplantables lymphoreticulocytäres Sarkom des Goldhamsters. **[A spontaneous transplantable lympho-reticulocytic sarcoma in the hamster.]**—Z. Krebsforsch. **63**, 503-510. [Summary in English.] **844**

Four hamsters in a colony of 50 developed sarcoma at the age of 4 or 5 months. Only one tumour (of the left femur) was successfully transplanted to the cheek pouch or peritoneum of other hamsters.—R.M.

Barron, C. N. & Saunders, L. Z. (1959). **Intraocular tumors in animals. II. Primary non-pigmented intraocular tumors.**—Cancer Res. **19**, 1171-1174. **845**

The authors discussed the literature and reported a haemangioma in a dog, chondrosarcoma in a cat and leiomyoma of the constrictor muscle of the iris in a dog.—R.M.

Gottschalk, C. (1960). Untersuchungen zur Geschlechtsumwandlung bei einem Huhn. **[Change of sex in a fowl.]**—Zbl. allg. Path. path. Anat. **101**, 139-149. **846**

Arrhenoblastoma of the ovary caused a hen aged 2½ years to assume the appearance and behaviour of a cock.—R.M.

Mellors, R. C. & Munroe, J. S. (1960). **Cellular localization of Rous sarcoma virus as studied with fluorescent antibody.**—J. exp. Med. **112**, 963-974. [Authors' summary modified.] **847**

A study has been made of the immunospecific, apple-green staining patterns imparted by fluorescent antibody to Rous virus in frozen sections of wing tumours in chicks. Variations in cellular site, distribution (particulate or homogeneous), and quantity of Rous viral antigens were seen. The proportion of sarcoma cells containing viral antigens was related to the tumour initiating dose of virus and to the infectivity titre of virus extracted from the wing tumour. A quantity of virus approaching one tumour-producing dose per tissue section was detectable with fluorescent antibody.

Sarcoma cells containing viral antigens were identified as early as 4 days after inoculation of Rous virus. At this time viral antigens were also localized in the skeletal muscle of the inoculated wing in a characteristic focal pattern of deposition near or on the sarcolemma. This association between viral antigens and skeletal muscle fibres was observed also at 3 days after virus inoculation, when sarcoma cells were not yet demonstrable in the tissue sections.

Viral antigens were detected in sarcoma cells in lung tumours of chicks and in tumours of the chorioallantoic membrane of chick embryos.

Lagerlöf, B. (1960). **Studies of fowl erythroleukemia induced by intact cells or virus. I. The fate of transplanted erythroleukemia cells, as revealed by histo-pathological and quantitative cytological investigations. II. Response differences.**—Acta path. microbiol. scand. **49**, 438-454 & 455-466. [In English.] **848**

Lagerlöf, B. (1960). **In vitro investigations of the virus-induced fowl erythroleukemia. III. Behaviour in vivo of normal bone marrow cells, cultivated in vitro in the presence of erythroleukemia virus.**—Ibid. 467-479. [In English.] **849**

Lagerlöf, B. (1960). **In vitro and in vivo investigations of fowl erythroleukemia. With special reference to the virus-induced leukemic transformation of in vitro cultivated normal bone marrow cells.**—Ibid. Suppl. No. 138. pp. 19. [In English.] **850**

Unequivocal malignant properties *in vivo* of cells cultured *in vitro* and exposed to tumour-producing virus have not so far been demonstrated. In this series of papers, the results are reported of investigations into the possibility of inducing leucaemic transformation of normal chicken bone marrow cells *in vitro* through the action of fowl erythroleucaemia virus. Large quantities of normal and leucaemic bone marrow cells were cultured for 4–8 weeks. The rate of virus production by both leucaemic and virus infected normal cells is the same as occurs in

fowls. Intravenously injected intact leucaemic cells from infected chickens induced widespread, multifocal proliferating lesions within one day of injection into random bred chickens, whilst after injection of virus-containing homogenates of similar quantities of leucaemic cells, leucaemic changes were not observed for about 3 days and then were primarily confined to the bone marrow sinusoids. Transplanation leucaemia was evident at least 2 days earlier and ran a shorter time course than virus-induced leucaemia. When virus-infected, cultivated, primarily normal bone marrow cells were injected into chickens, no disease was induced by cells cultured for 5 days in the presence of virus (eclipse phase), a virus-induced type of leucaemia was evident after 7 days, but after 14 days or more of cultivation, a transplantation type of leucaemia was induced. This indicated that the cells had been transformed by the virus into cells behaving like leucaemic cells *in vivo* and induced a disease which had not been initiated by the action of leucaemia virus on the hosts' own bone marrow target cells.—A. Ackroyd.

NUTRITIONAL AND METABOLIC DISORDERS

Comfort, A. (1960). **Nutrition and longevity in animals.** — Proc. Nutr. Soc. **19**, 125-129. **851**

Although it is easy to kill animals prematurely by altering their diet, there are relatively few ways of increasing their life span. Ways in which the life of some invertebrates may be lengthened include, restriction of diet at certain stages of the life cycle, increasing the food reserves, or reduction of an activity such as egg laying. Most of the work on vertebrates has been done on rats and mice, in which the most effective way of lengthening life is to retard growth and development by dietary means. Certain foodstuffs are associated with specific causes of death in mice. It is concluded that overnutrition can be as disastrous as undernutrition to animals.—E. J. Castle.

King, J. O. L. (1960). **Factors affecting the solids-not-fat content of cows' milk.** — Vet. Rec. **72**, 984-987 & 988. [Author's summary modified.] **852**

Factors influencing the amount of solids-not-fat in milk are breed, strain and individuality; age, with a decrease in older cows; stage of lactation, with a rise in fertile and a fall in barren cows; diet, affecting particularly the protein fraction; season, with a fall in April and, to a lesser extent, in August; environmental temperature; hormones; systemic disease; mastitis, reducing above all the lactose content; and milking technique.

Natscheff, B., Kristanoff, T., Ibrischimoff, N. & Konstantinoff, A. (1960). Über den Luzerneausschlag bei Kühen und Kälbern. **[Lucerne eruption in cows and calves in Bulgaria.]**—Berl. Münch. tierärztl. Wschr. **73**, 263-265. [Summary in English.] **853**

In the Lom district of northern Bulgaria, a weeping dermatitis has developed regularly for the past 3–4 years, in June, in cows and calves exposed to the sunlight for several hours after eating large quantities of fresh lucerne. The parts of the body affected most frequently are the hind legs and feet, and the udder. Inflammation of the mucous membranes of the mouth and eyes, and of the muzzle is sometimes seen. Animals recover spontaneously in 15–20 days. Histological examination of the lesions revealed parakeratosis, papillomatosis and round-cell infiltrations.—M.G.G.

Dowden, D. R. & Jacobson, D. R. (1960). **Inhibition of appetite in dairy cattle by certain intermediate metabolites.** — Nature, Lond. **188**, 148-149. **854**

In trials with sets of twin cows, one twin was given a constant drip infusion of a metabolite for 8 hours on each of 3 consecutive days, and the other twin received physiological saline alone. Appetite was greatly depressed during the period of infusion by sodium acetate, acetic acid, and propionic acid, but not by glucose and butyric, valeric, hexanoic and lactic acid.—M.G.G.

Johnson, R. H., Allen, R. S., Jacobson, N. L., Woods, W. R. & Warner, D. R. (1960). **An emulsified soybean oil for bloat therapy.**—J. Dairy Sci. **43**, 1341-1342. **855**

Of 95 cattle with moderate to severe bloat that could not be relieved by stomach tube, 90 recovered promptly after drenching with soya bean oil, and 4 recovered after a second treatment. Good results were reported in bloating lambs.—M.G.G.

Reber, E. F. & Norton, H. W. (1960). **Studies of the effects of chlortetracycline, vitamin E, and vitamin K on the nutrition of the rat.**

II. Reproduction.—Amer. J. vet. Res. **21,** 898-901. [Authors' summary modified.] **856**

Vitamin K and chlortetracycline were effective in overcoming vitamin E deficiency to the extent of permitting female rats to bear young. Chlortetracycline was the more effective in that it enabled the females to bear young and rear them to weaning age. The average weight gain of rats fed the basal ration plus vitamin E was greater than that of rats not receiving vitamin E. Vitamin K and chlortetracycline increased body weight gains significantly and about equally.

Lassiter, C. A. & Brown, L. D. (1960). **The effect of feeding chlortetracycline on the milk production and health of milking cows.** — Quart. Bull. Mich. agric. Exp. Sta. **43,** 105-116. **857**

Contrary to the findings of other workers, the feeding of chlortetracycline at 1 mg. per lb. body weight daily to cows slightly increased milk yield. In the first trial, April to September, involving 519 cows in 18 herds, the Aureomycin fed cows (half of the cows in each herd) produced 0·21 lb. more milk per cow daily compared with the controls and were significantly more persistent in milk flow. In the second trial, October to April, involving 366 cows in 14 herds, the increase was 1·81 lb. per cow daily. Observations on herd health were limited, but the Aureomycin fed cows appeared more resistant to Pink Eye infection. Some bloat was encountered associated with the feeding of Aureomycin (45 cases to 1 in the controls). In most cases it was cured by cutting the level of Aureomycin by half for a week and then bringing the cows back to the full dose slowly.

—A. Ackroyd.

MacFadden, D. L., Bartley, E. E., Claydon, T. J. & Lord, T. H. (1960). **Mode of action of antibiotics in the nutrition of the dairy calf. IV. Phagocytosis of antibiotic-resistant strains of Escherichia coli.** — J. Bact. **80,** 325-330. [Authors' summary modified.] **858**

A study was made on the development of drug-fastness in two strains of *E. coli* pathogenic to calves. Drug resistance to chlortetracycline was difficult to induce initially in the organism, and resistance was acquired in a step-wise progression from any given concentration of the drug to the next higher concentration. Low levels of chlortetracycline altered the growth curve of the bacteria, and repeated transfers in these low concentrations of antibiotic resulted in re-establishing a normal growth curve by the organism. The organisms which had become drug resistant were more susceptible to phagocytosis than their non drug-resistant sister cells even after 5 transfers in the absence of the drug.

It was postulated that the feeding of nutritional levels of chlortetracycline contributes to the stimulation of the growth rate of the calves by reducing the resistance to phagocytosis of intestinal bacteria, thereby aiding the host defence mechanism. Such mode of action would result in a reduction in incidence of intestinal infections which may cause stress in the early weeks of growth of the calf.

Ferrando, R. (1960). Les antibiotiques dans l'alimentation et le cholestérol chez le porc. **[Cholesterol content of the blood of pigs given antibiotics in their food.]** — Industr. Aliment. Anim., Paris No. 109, pp. 31-34. **859**

The cholesterol content of the blood in 32 pigs given oleandomycin alone (2–20 mg. per kg. of food) or with oxytetracycline (6 mg./kg. plus 2 mg./kg. oleandomycin) for 136 days was not significantly higher at slaughter than in 10 pigs not given antibiotic. There was a slight but not significant increase in blood lipoproteins in pigs given antibiotic.

—M.G.G.

Dubost, P., Ganter, P., Julou, L. & Pascal, S. (1960). Influence éventuelle de la chlortétracycline, mélangée à la nourriture du poulet comme adjuvant d'alimentation, sur la teneur en cholestérol des principaux organes et sur l'apparition d'athérosclérose. **[Influence of chlortetracycline in the feed of chickens on cholesterol content of organs and incidence of atherosclerosis.]** — Bull. Acad. vét. Fr. **33,** 399-410. **860**

The cholesterol content of liver, kidney and muscle in 20 chickens given chlortetracycline at the rate of 15 g. per metric ton of food for the first 12 weeks of life, followed, in 10 chickens, by 100 g./metric ton for 2 weeks, was not significantly different from that in 10 controls. Arteries and kidneys were histologically normal, but the liver of 2 birds given the high dose of antibiotic was fatty, without signs of degeneration.—M.G.G.

Brion, A. (1960). Influence de la supplémentation des aliments par les antibiotiques sur le métabolisme lipidique des poulets de chair. **[Influence of antibiotic supplements on the**

lipid metabolism of broiler fowls.]—Industr. Aliment. Anim., Paris No. 109, pp. 43, 45-47 & 51. **861**

Thirty chicks were fed a ration containing 8 g. of penicillin, 30 a ration containing 180 g. penicillin and 20 g. erythromycin per metric ton, and 30 a ration free from antibiotics. Examinations at the ages of 8, 10 and 12 weeks revealed that antibiotics had no influence on the cholesterol content of the blood and artery walls, blood lipids, nor the histological appearance of the arteries.

—M.G.G.

Boyd, J., Weiser, H. H. & Winter, A. R. (1960). **Influence of high level antibiotic rations with terephthalic acid on the antibiotic content and keeping quality of poultry meat.** —Poult. Sci. **39**, 1067-1071. [Authors' summary modified.] **862**

High level (1 kg./ton) feeding of chlortetracycline (Ctc) and of oxytetracycline (Otc) to broilers and laying hens resulted in storage of the antiboitics in the serum, liver and in dark and white meat.

Feeding terephthalic acid (TPA) at 0·05% in the high level Ctc and Otc rations resulted in about double the storage in the tissues.

Feeding a low calcium ration with high level Ctc or Otc with TPA further increased the storage in the tissues.

High level Ctc feeding with TPA resulted in longer keeping time of cut-up parts of chickens held at 35°F.

Cox, D. H. & Hale, O. M. (1960). **Dietary hormones and fat and serum cholesterol, transaminases and copper in swine.**—J. Nutr. **72**, 77-80. [Authors' summary modified.] **863**

Young, growing pigs were fed either varying levels of testosterone or a single level of stilboestrol supplemented with 5 or 10% of beef tallow and the serum was analysed for cholesterol, glutamic oxalacetic and glutamic pyruvic transaminases and copper.

Testosterone reduced serum cholesterol, but stilboestrol had no apparent effect. Castration increased blood cholesterol. Beef tallow at 5 and 10% of the diet increased serum cholesterol.

Stilboestrol increased serum copper, but testosterone had no effect. None of the factors studied influenced serum transaminases.

Machlin, L. J. & Gordon, R. S. (1960). **Linoleic acid as causative agent of encephalomalacia in chickens fed oxidized fats.** — Proc. Soc. exp. Biol., N.Y. **103**, 659-663. **864**

Chicks fed heated, aerated unsaturated fats developed encephalomalacia, which was prevented by vitamin E or an antioxidant. The incidence of encephalomalacia was correlated with the linoleic acid but not the linolenic acid content of the fats.—M.G.G.

Nesheim, M. C., Calvert, C. C. & Scott, M. L. (1960). **Effect of arginine deficiency on nutritional muscular dystrophy in the chick.** —Proc. Soc. exp. Biol., N.Y. **104**, 783-785. [Authors' summary modified.] **865**

Nutritional muscular dystrophy did not occur in chicks when an arginine deficient diet was fed even though the diet was low in vitamin E and sulphur amino-acids. When arginine was included in the basal diet, a high incidence of muscular dystrophy was observed by 5 weeks of age, even when growth was restricted in the chicks receiving adequate arginine by paired feeding with the basal group.

Owen, E. C., Ellis, S. E., Voss, R. C., Wilson, A. L. & Robertson, J. (1960). **The occurrence of phosphates of calcium on cobalt oxide 'bullets' administered to lambs to prevent pining.**—Proc. Nutr. Soc. **19**, No. 2. pp. xxi-xxii of Abstracts. **866**

The white incrustrations on cobalt bullets from the reticulo-rumen of lambs were examined by chemical, optical and spectrographic methods. These consisted mainly of brushite ($CaHPO_4 2H_2O$) and whitlochite ($Ca_3(PO_4)_2$) and thus resembled some urinary and salivary calculi and dental tartar. It is suggested that the production of ammonia by bacteria allows these phosphates to be deposited.—E. J. Castle.

Turk, J. L., Jr. & Kratzer, F. H. (1960). **The effects of cobalt in the diet of the chick.**—Poult. Sci. **39**, 1302. [Authors' abst. modified.] **867**

Experiments conducted over two years with several breeds of chickens have indicated a requirement for cobalt which is independent of its incorporation in the vitamin B_{12} molecule. The optimum dietary level of Co was 4·7 p.p.m. Levels in excess of 5 p.p.m. depressed growth and levels in excess of 50 p.p.m. killed some chicks. Toxicity was partly alleviated by increasing the dietary fat-soluble vitamins or by adding an antioxidant. Complete alleviation occurred when EDTA (ethylenediaminetetraacetate), a

chelating agent, or when either cystine or cysteine were incorporated into the diet. Signs of cobalt toxicity include emaciation, debility, inanition, sensitivity to being touched, and mortality.

van der Horst, C. J. G. (1960). **Balance experiments with milking cows.** — Tijdschr. Diergeneesk. **85,** 1060-1088. [In English. Summaries in French, German and Dutch.] **868**

Three pairs of milking cows were fed hay and concentrates and then changed to grass rich in potassium or nitrogen or from a pasture on which hypomagnesaemia was prevalent. Balance trials for Na, K, Ca, Mg, Mn, P and N were made before and after the change. The daily intake and excretion in urine and faeces of these elements is discussed and changes in serum Ca, Mg and P studied. The fall in serum Mg occurring after the change to the 'tetany prone' grass was maintained until magnesium oxide was administered. The change to a grass diet resulted in the absorption of a greater percentage of Na and K and a greater increase in the excretion in the urine of N and P. The administration of magnesium resulted in a greater absorption of potassium.

—E. J. Castle.

Mills, C. F. (1960). **Comparative studies of copper, molybdenum and sulphur metabolism in the ruminant and the rat.** — Proc. Nutr. Soc. **19,** 162-169. **869**

High levels of molybdenum and sulphate in the diet of sheep result in depletion of copper stores and symptoms of copper deficiency. In rats excess molybdenum promotes copper storage in the liver but appears to prevent its utilization by the body, and the further addition of sulphate prevents the accumulation of copper in the liver and alleviates the symptoms of copper deficiency. The differences in the action of sulphate could be associated with its rapid reduction to sulphide in the rumen and its limited reduction in the caecum and colon of non-ruminants. Sulphide added to a molybdenum rich diet in rats has deleterious effects. It is concluded that in the ruminant molybdenum in the diet may restrict copper absorption whereas in the rat it restricts copper utilization by the tissues.

—E. J. Castle.

Ruckebusch, Y., Joubert, L., Jean-Blain, M. & Oudar, J. (1960). Vitamine A et infection pasteurellique expérimentale du porc. Fluctuations de l'activité cholinestérasique érythrocytaire et plasmatique. [**Cholinesterase activity of erythrocytes and plasma in pigs with pasteurella infection superimposed on vitamin A deficiency.**]—Bull. Acad. vét. Fr. **33,** 391-397. **870**

The cholinesterase activity of the r.b.c. in 9 pigs deficient in vitamin A was 10% less than in 3 control pigs, and fell by 80% during superimposed *Past. septica* infection. The cholinesterase activity of the plasma was unaffected by vitamin A deficiency, and fell slightly during experimental *Past. septica* infection in both groups.—M.G.G.

Griffiths, T. W. (1960). **Studies on the requirement of the young chick for vitamin E. The effects of different sources and levels of dietary starch on gain in weight and body vitamin E storage.**—Brit. J. Nutr. **14,** 269-280. **871**

Four groups of day-old chicks were fed four basal diets low in vitamin E and containing 55 or 65% wheat or maize starch. Each group was divided into 4 sub-groups of 10–15 chicks and fed the diet plus 0, 2·72, 5·44 or 10·88 mg./100 g. diet of DL-α-tocopherol acetate. Liveweight gains and food consumption were recorded. All surviving birds were killed after 6 weeks and examined P.M. and the cerebellum examined histologically. Tocopherols were estimated in serum, liver, diet and droppings, and liver fatty-acids were determined.

Tocopherol content of diet had little effect on weight gain. Deaths occurred in all groups, generally during the first two weeks, and were due to exudative diathesis, but birds killed at 6 weeks showed no signs of tocopherol deficiency. There was a linear relationship between logarithms of the values for serum tocopherol and level of vitamin E in diet. A higher level of α-tocopherol was found in the livers of the chicks on the maize diet than on the wheat diet.—E. J. Castle.

Schulze, W. (1960). Pantothensäuremangelerkrankung beim Schwein. [**Pantothenic acid deficiency in pigs.**]—Dtsch. tierärztl. Wschr. **67,** 245-246. [English summary modified.] **872**

A report of several cases of pantothenic acid deficiency in pigs, which exhibited the characteristic "goose-stepping" of the hind legs.

Kodicek, E. (1960). **Rheumatoid-like joint lesions in guinea-pigs with chronic partial**

vitamin C deficiency.—Proc. Nutr. Soc. **19,** No. 2. pp. xxxiii-xxxiv of Abstracts. **873**

A prolonged partial deficiency of vitamin C was induced in 108 guinea-pigs given 0·5–1 mg. ascorbic acid daily after 10 days of deficiency. In the 4th or 5th week 55 animals developed swelling of one or both knee joints with eventual complete ankylosis. Controls receiving 10 mg. ascorbic acid/day were not affected. The lesion resembled that of human rheumatoid arthritis. The adrenals of the deficient animals with joint lesions were greatly enlarged and histologically abnormal. Treatment with cortisone acetate (10 mg./day) reduced the swelling but did not improve movement or the histological picture of the joints. Ascorbic acid had no effect at this stage. Preventive daily injections of 5 mg. cortisone acetate protected animals from joint lesions but deoxycortone acetate appeared to increase the incidence. It is suggested that the joint lesions are due to an indirect effect of deficiency which first damages the adrenals.

—E. J. Castle.

I. Aikawa, J. K. (1960). **Effect of thyroxine and propylthiouracil on magnesium metabolism in the rabbit. Study with Mg^{28}.**—Proc. Soc. exp. Biol., N.Y. **104,** 594-597. **874**

II. Aikawa, J. K. & Bruns, P. D. (1960). **Placental transfer and fetal tissue uptake of Mg^{28} in the rabbit.** — Ibid. **105,** 95-98. [Authors' summaries modified.] **875**

I. Although thyroxine or propylthiouracil produced alterations in magnesium metabolism which were demonstrable by Mg^{28}, the changes were insufficient to be detected by usual external balance technique. In potassium, another cation which is predominantly intracellular in location, a decrease in extracellular concentration reflects a depletion of the intracellular store. Such a simple relationship does not seem to hold true with magnesium. Even though administration of propylthiouracil suppressed bone uptake of Mg^{28} sufficiently to decrease the exchangeable body content of Mg, serum Mg concentration did not change.

II. Mg^{28} was injected i/v into 11 pregnant rabbits between 28 and 30 days of gestation. Foetuses and placentas were removed at intervals ranging from 7 min. to 26 hours. Maternal tissue uptake of Mg resembled that previously found in non-pregnant young adult rabbits, except that uptake in bone and muscle was slower. Concentration of Mg in the placenta rose rapidly above the maternal plasma level. Specific activity of magnesium in all foetal tissues studied reached a fairly constant value by 26 hours. Magnesium turnover in tissues of the foetus in the uterus, especially in bone and muscle, is considerably more rapid than that in the same tissues of the mother.

I. Fisher, R. B. (1960). **The action of insulin on carbohydrate metabolism.** — Brit. med. Bull. **16,** 224-227. **876**

II. Folley, S. J. & Greenbaum, A. L. (1960). **Insulin and metabolism of fatty acids.**—Ibid. 228-232. **877**

I. The regulation of blood sugar concentration by insulin could be effected by either a direct action on hepatic glucose uptake and release or by the control of glucose utilization by pheripheral tissue, *i.e.*, mainly muscle.

The experimental evidence for an effect on the liver is conflicting but in general it does not clearly show that either an increase in hepatic glucose uptake or an inhibition of glucose output occurs.

There is however clear evidence that insulin promotes the uptake of glucose by pheripheral tissue, in particular by rat diaphragm.

Conversion to glycogen does not account for all the glucose removed from the circulation and it is believed that transformation to fatty acids may be facilitated.

Earlier reports that the hexokinase reaction is activated or that its inhibition by an anterior pituitary factor is diminished have not been substantiated.

Similarly the idea of a qualitative alteration in the carbohydrate metabolism of the tissue has not been supported and it has been shown that the phosphogluconate and Embden-Meyerhof pathways of glycolysis are equally stimulated.

It seems likely that the major effect of insulin may be to regulate the access of glucose to peripheral cells rather than to increase its utilization by activating a particular enzyme.

II. It has been shown that liver slices from diabetic rats have a reduced ability to incorporate acetate into long-chain fatty acids and that treatment of diabetic animals with insulin restores to normal the capacity of the liver to synthesize fatty acids. The block in synthesis is believed to occur at a point subsequent to the formation of acetyl-coenzyme A and it is also thought that a high rate of glycolysis is essential for lipogenesis. Further evidence suggests that diabetic liver lacks a factor necessary for the conversion of

the two-carbon unit to butyryl-coenzyme A, and that the addition of fructose 1 : 6-diphosphate stimulates lipogenesis.

Insulin markedly stimulates the incorporation of acetate carbon and glucose carbon into fatty acids by mammary gland slices from the lactating rat but not from the lactating ewe.

In adipose tissue, both insulin and glucose are necessary to increase lipogenesis and it is concluded that the effect of insulin is probably on the transformation of extracellular glucose to intracellular glucose-6-phosphate by increasing cell permeability, and also by enzymic conversion to the phosphate ester.

Lipogenesis in liver is believed to be linked to triphosphopyridinenucleotide (TPNH) but in the mammary gland fat synthesis may occur with diphosphopyridinenucelotide as hydrogen donor.

For the production of TPNH, increased activity of the pentose phosphate pathway of glycolysis is necessary as there is reason to believe that coenzymes from the Krebs cycle are not available for lipogenesis.

On the whole the evidence might suggest that insulin either facilitates fatty acid synthesis followed by a second stimulation of glycolysis to regenerate TPNH or that the increased TPNH arising from increased glycolysis causes a secondary increase in lipogenesis.

Whichever idea is correct the failure of insulin to stimulate lipogenesis in ruminant mammary tissue is an interesting anomaly.

—E. J. H. Ford.

Jarrett, I. G. & Filsell, O. H. (1960). **Acetate tolerance in the young lamb.**—Nature, Lond. **188**, 418-419. **878**

The concentrations of total volatile fatty acids were determined in the blood and urine of 5 lambs injected i/v at intervals of a few days during the first 4 months of life with acetic acid neutralized with sodium hydroxide. During the first 4 weeks all injected acetate disappeared from the blood within 30 min., compared with up to 60 min. with increasing age. Less than 4% of the dose appeared in the urine.—M.G.G.

Jarrett, I. G. & Filsell, O. H. (1960). **The effect of diet on acetate tolerance in sheep.**—Aust. J. exp. Biol. med. Sci. **38**, 347-354. [Authors' summary modified.] **879**

The rate of disappearance of injected acetate from the vascular system of sheep fed lucerne chaff is much more rapid than that of sheep fed wheat chaff. Animals feeding on green pasture respond to injected acetate in a manner similar to those eating lucerne chaff, whereas animals on dry pasture respond like those on wheat chaff. Within two days of changing from a diet of wheat chaff to lucerne chaff the tolerance to acetate characteristic of a lucerne chaff diet can be observed. A longer time is required for the alteration in tolerance when sheep which have been eating lucerne chaff are changed to wheat chaff. Possible factors involved in the nature of the diet and their effect on the ability of the sheep to utilize acetate are discussed.

DISEASES, GENERAL

Beveridge, W. I. B. (1960). **Economics of animal health.**—Vet. Rec. **72**, 810-815. **880**

In western Europe and the U.S.A., losses from animal disease have been estimated at about 15% of the total production. Applied to the U.K., this figure means an annual loss of about 150 million pounds. Yet, of the 260 million pounds spent on farm subsidies in the U.K. in 1959, only 3½ millions were for research on animals. A wiser financial policy would be to invest more in research.—M.G.G.

Australian Veterinary Association. (1960). **Evidence given to the Dairy Industry Committee of Enquiry.**—Aust. vet. J. **36**, 96-101. Appendices pp. 101-104. **881**

The report deals with: I. Increased production per cow in the national dairy herd (giving comparative figures for England and Wales, New Zealand, the U.S.A. and Australia); II. Factors leading to increased production per cow, including breeding, nutrition and disease control; III. Diseases which reduce production (supported by statistical data from several States); these include mastitis, abortion and infertility (with discussion of causes), metabolic diseases, internal parasites, cattle tick infestation, trace element deficiencies, bovine contagious pleuropneumonia, exotic diseases (specific comments on the 1923 outbreak of rinderpest); IV. The role of the veterinarian; V. Summary and conclusions. The six appendices contain fairly detailed data: "A", survey of loss due to mastitis in a herd owned by a Victorian dairy farmer, 1956-59; "B", effect of *Vibrio fetus* infection on production; "C", basis on which monetary loss in Queensland has been

calculated; "D", effect of parasitism on calves; "E", effect of cobalt supplementation by cobalt "bullets" on milk and butter-fat production; "F", general report from the meeting of farmers representatives in a co-operative veterinary scheme.

The report contains data of particular interest to all veterinarians engaged in dairy practice and to departmental and research officers concerned with diseases of cattle.

—H. McL. Gordon.

Gorham, H. J., Griffiths, H. J. & Farrell, R. K. (1960). **Minks: diseases and parasites.** — Agric. Handbk U.S. Dept. Agric. No. 175 pp. 36. 20 cents. **882**

A revised edition of Farmers' Bulletin No. 2050 issued in 1952.—R.M.

Anon. (1960). **Chinchilla fur farming series. Diseases and ailments bibliography.** pp. 8. Middletown, New York: National Chinchilla Breeders of America Inc. **883**

This eight-page bibliography lists under subject headings selected references to diseases of chinchilla. The complete set of 27 N.C.B.A. Research Bulletins plus the Chinchilla Fur Farming Series is available to veterinary surgeons outside the U.S.A. at a cost of $4.00 inclusive of air-mail postage from National Chinchilla Breeders of America Inc., P.O. Box 145, Middletown, N.Y., U.S.A.—R.M.

Jansen, J. & Wemmenhove, R. (1960). Sectiebevindingen bij duizend kippen, afkomstig van een pluimveemarkt. **[Post-mortem findings in a thousand chickens, originating from a poultry market.]** — Tijdschr. Diergeneesk. **85,** 1565-1581. [In Dutch. Summaries in English and German.] **884**

During a year all fowls rejected by food inspectors at a certain market were sent to the Institute for Veterinary Virology at Utrecht. Diseases were classified into 29 groups and their incidence compared with data obtained in 1932 and 1948. Leucosis and tumours showed large increases in incidence, but TB., pericarditis, coccidiosis, pox, coryza had decreased since 1932. The leucosis complex was found in 26% of birds submitted in 1959, and tumours in 18% (187 birds). Tumours of the peritoneum were commonest (94 cases) followed by liver (60), ovary (51), intestine (41), kidney (28), salpinx (18). Carcinoma accounted for 2·4% of cases; sarcoma 20%, *E. coli* granuloma 15%, haemangioma 13%.

Salpingitis with peritonitis was very common: it was found in 10% of birds examined P.M. in 1932, 26% in 1948 and 22·5% in 1959.—R.M.

Wagenaar, G. (1960). Koliek bij het rund. **[Colic in the cow.]**—Tijdschr. Diergeneesk. **85,** 1515-1535. Discussion: p. 1536. [In Dutch. Summaries in English, French and German.] **885**

W. classified 102 cases treated at the Veterinary Faculty at Utrecht during a period of two years.—R.M.

Kuil, H. & Wiersema, J. P. (1960). Een bijzondere vorm van longontsteking bij kalveren. **[A special form of pneumonia in calves.]** — Tijdschr. Diergeneesk. **85,** 1277-1282. [In Dutch. Summaries in English, French and German.] **886**

In Dutch Guiana four calves aged between 6 days and 22 weeks died rapidly during a period of ten days, with signs of dyspnoea. Histological examination of the lungs revealed hyaline membranes and giant cells. It was not possible to examine the lungs for presence of virus.—R.M.

Wensvoort, P. & van den Akker, S. (1960). Multipele symmetrische encephalomalacie bij lammeren en schapen op Texel. **[Multiple symmetrical encephalomalacia in lambs and sheep on the island of Texel.]** — Tijdschr. Diergeneesk. **85,** 1234-1242. [In Dutch. Summaries in English and German.] **887**

Nine lambs and a sheep died after illness manifested by nervous systems. P.M. examination revealed lesions of focal symmetrical encephalomalacia similar to that described by Hartley in New Zealand and by Barlow in the United Kingdom [*V.B.* **27,** 203 & 3088]. Non-pathogenic staphylococci were cultured from the brain of one lamb and *L. monocytogenes* was cultured from retropharyngeal lymph nodes of another; the remaining cases yielded no cultures. Copper content of liver from two lambs was 178 and 356 μg./g. of dry matter. The animals came from ten flocks and there was no association between clostridial enterotoxaemia and encephalomalacia.—R.M.

Blincoe, C. & Marble, D. W. (1960). **Blood enzyme interrelationships in white muscle disease.** — Amer. J. vet. Res. **21,** 866-869. [Authors' summary.] **888**

In white muscle disease in lambs, and in muscular dystrophy induced by feeding cod liver oil, the serum lactic dehydrogenase increased greatly and, in severe cases, the serum alkaline phosphatase decreased to half

its normal value. No change was demonstrated in acid phosphatase. True cholinesterase was absent in serum from both normal and diseased animals.

A highly significant linear correlation exists between serum lactic dehydrogenase and glutamic oxalacetic-transaminase in white muscle disease. No correlation could be demonstrated between serum alkaline phosphatase and glutamic-oxalacetic transaminase. The alkaline phosphatase level in lambs with white muscle disease was reduced only in severely affected lambs with very high transaminase levels.

I. Terpstra, J. I. & Akkermans, J. P. W. M. (1960). Enkele aantekeningen over atrofische rinitis. [**Observations on atrophic rhinitis in the Netherlands.**] — Tijdschr. Diergeneesk. **85,** 1222-1233. **889**

II. van der Schaaf, A. (1960). Atrofische rinitis bij varkens. [**Atrophic rhinitis in pigs.**] — Ibid. 1437-1448. [In Dutch. Summaries in English, French and German.] **890**

I. Investigations at the Rotterdam laboratory of the Central Veterinary Institute showed that some cases of atrophic rhinitis were associated with bacterial infections, particularly *Pasteurella,* while others were associated with inclusion-body rhinitis (in one of six farms studied). The disease was reproduced in piglets aged 3–5 days by intranasal inoculation of suspension of nasal mucosa from the first type of case, and by intranasal inoculation of *Pasteurella* cultures from affected pigs. It seemed that inclusion-body rhinitis could interfere with normal growth of bone tissue of the turbinate bones and could by itself give rise to pneumonia.

II. Experience in the Netherlands confirmed that several agents could cause atrophic rhinitis. The author was in favour of abandoning legislation for the control of the disease. He reported experiments done at the Institute for Veterinary Bacteriology at Utrecht; attempts to infect month-old piglets by intranasal instillation of culture suspensions of *Haemophilus suis* or *Pasteurella multocida* failed.—R.M.

Bömer, H. (1960). Bestimmungen des Calcium- und Magnesiumgehaltes des Herzmuskels von gesunden und von an sog. Herztod erkrankten Schweinen. I. Mitteilung: Quantitative Bestimmungen. [**Calcium and magnesium content of the heart muscle in pigs in health and fatal syncope.**]—Dtsch. tierärztl. Wschr. **67,** 587-589. **891**

The heart muscle of 13 pigs that had been stunned electrically and bled after developing signs of fatal syncope contained 6 mg.% Ca and 11·2 mg.% Mg, whereas heart muscle from 10 healthy pigs contained 4·75 mg.% Ca and 9·2 mg.% Mg. The findings were discussed in relation to the literature [see *V.B.* **25,** 1757] and the method of slaughter. —M.G.G.

Thoonen, J. & Hoorens, J. (1960). Spiernecrose bij varkens. [**Muscle necrosis in pigs.**] — Vlaams diergeneesk. Tijdschr. **29,** 205-209. [In Flemish. Summaries in English, French and German.] **892**

Necrosis of unknown cause was encountered in the longissimus and multifid muscles of the spine of store pigs. The condition commenced with swelling of the muscles accompanied by pain, difficulty in moving and diminished appetite. With the onset of necrosis the pain disappeared, normal appetite returned and the affected muscles atrophied so that the pig developed a ridged back (illustrated). The condition appeared to be encountered fairly often in sides of bacon. —R.M.

Kast, A. & Kersten, W. (1960). Initialstadien einer akuten hämorrhagischen Pancreasnekrose beim Schwein. [**Initial stages of acute haemorrhagic necrosis of the pancreas in pigs.**]—Berl. Münch. tierärztl. Wschr. **73,** 336-338. [Summary in English.] **893**

In a gilt weighing 15 kg. submitted for P.M. examination, the cause of necrosis of the left lobe of the pancreas was obstruction of the accessory duct by an ascarid worm.—R.M.

Trautwein, G. (1960). Partielle Rückenmarkskompression beim Schwein durch abszedierende Spondylitis. [**Compression of the spinal cord in pigs due to purulent spondylitis.**]—Dtsch. tierärztl. Wschr. **67,** 294-299. [Summary in English.] **894**

Four piglets aged 5 or 6 weeks from two litters developed slow progressive posterior paresis and were killed for examination. In three of them the spinal cord was compressed as a result of abscess formation within the bodies of several thoracic vertebrae. Histology was described. *E. coli* and *Staph. pyogenes* were isolated from the organs of one pig. The fourth piglet had arthritis of the stifle joint. —R.M.

Dämmrich, K. (1960). Beiträge zur Morphologie der Nebennierenrinde bei Spontanerkrankungen des Hundes. **[Morphology of the adrenal cortex in diseases of dogs.]** — Zbl. VetMed. **7**, 553-594. [Summaries in English, French and Spanish.] **895**

Six types of change were found in the cortex of adrenals of 100 dogs submitted for P.M. examination at the Institute for Veterinary Pathology at Berlin Free University:— (1) slight deformity of the arcuate zone; (2) disruption of structure in the arcuate zone of the cortex by haemorrhages and cell dissociation; (3) formation of "pseudo-glomeruli" in the arcuate zone; (4) "pseudo-glomeruli" plus abundant connective-tissue infiltration; (5) severe deformity and atrophy of the arcuate zone; (6) replacement of the zone by cords of fascicular-zone cells. There are 19 illustrations. Incidental findings were three adenomas, one malignant adenoma and one carcinoma of the adrenal cortex. The role of the stress syndrome in diseases of dogs was discussed.—R.M.

Martinsons, E. (1960). Relasjoner mellom serumjern, organjern, serumproteiner og hematologiske verdier hos mink. **[Relationships between iron in serum and organs, blood proteins and blood picture in healthy and anaemic mink.]** — Nord. VetMed. **12**, 471-489. [In Norwegian. Summaries in English and German.] **896**

The analyses were made on serum from blood samples withdrawn by heart-puncture from healthy and unthrifty mink grouped according to the source of their dietary protein. The results, including iron-loading tests, are shown in 5 tables and 5 figures. Haemoglobin varied with the iron content of the serum. Fe-loading gave a stronger increase in serum Fe in animals with low starting values than in normal animals. Serum Fe reflected the Fe content of the liver, which in turn was significantly correlated with serum albumin. Haematological values (haemoglobin, erythrocytes, haematocrit) varied little in healthy mink at the age of 7 months. The variability was of about the same order of magnitude as found in man and in various domestic animals. Total serum protein and protein fractions (by electrophoresis) varied little in healthy mink. The Fe content of serum and of organs showed considerable variations.

In most of the unthrifty mink there were marked deviations from the normal values in one or more of the blood components. Those in poorest condition had low haematological values, reduced total serum proteins, increased globulin fraction especially γ-globulin. Those in better condition had normal haematological values but most of them had low liver Fe and a higher Fe content in the spleen. The "scatter" for serum Fe was greater than normal, indicating that the status of the blood alone is an inadequate criterion of state of health in mink.—F.E.W.

Matscher, R. (1960). Sulla necrosi della coda nell'allevamento del ratto albino. **[Ringtail in rats.]**—Arch. Vet. Ital. **11**, 297-300. [Summaries in English, French and German.] **897**

In an outbreak of ringtail in young albino rats it was observed that owing to a mechanical breakdown the relative humidity had fallen to 30–38% during 8 days before the appearance of the disease. When the r.h. was readjusted the condition gradually ceased and mortality fell. The association between low r.h. and ringtail was confirmed by keeping rats at 35–40% r.h. After 8–9 days tail lesions appeared and the mortality rate increased. The disease was again controlled by raising the r.h. to 60–70%.—T.E.G.R.

Brion, A., Fontaine, M., Fontaine, M. P. & Labie, C. (1960). Enzooties de cataracts chez les volailles. I. Note préliminaire. **[Epidemics of cataract in fowls.]** — Bull. Acad. vét. Fr. **33**, 349-353. **898**

Cataract occurred among about 100,000 birds in an area to the west of Paris during 1959 and 1960. In individual flocks between 30 and 95% of birds were affected. Ducks on one farm were also affected. Cataract was usually bilateral and was commonest in birds a month old. In many birds there were also lesions typical of avian encephalomyelitis, but in some no other lesions could be found in the body. Possible causes were discussed.—R.M.

McConnell, K. P. & Kreamer, A. E. (1960). **Incorporation of selenium-75 into dog hair.** —Proc. Soc. exp. Biol., N.Y. **105**, 170-173. [Authors' summary modified.] **899**

Trace amounts of Se^{75} injected subcutaneously into dogs as either labelled selenium tetrachloride or selenious acid were deposited and retained in hair for as long as 316 days. Se was found in the cystine-rich protein keratin when the latter was isolated as the thiosulphate, S-sulphokerateine, and in the cystine fraction isolated from hair. The

source of selenium which is incorporated into hair protein is discussed.

Upton, A. C., Kimball, A. W., Furth, J., Christenberry, K. W. & Benedict, W. H. (1960). **Some delayed effects of atom-bomb radiations in mice.**—Cancer Res. **20**, Suppl. to No. 8 pp. 60 + 16 plates. **900**

This report from the Oak Ridge National Laboratory deals with 16,000 mice, some of which were exposed to one of two atomic explosions originating from a tower 100 ft. high on Japtan Island, an atoll near Eniwetok. About a month after irradiation, surviving mice were transferred to the Oak Ridge Laboratory where they were under continuous observation until death. One of the conclusions was that the effect of this type of radiation was the same as that produced by laboratory sources of radiations. The incidence of neoplasms was recorded in detail. —R.M.

Kelly, A. L. & Jensen, D. (1960). **Chronic aortitis in the California sea-lion, Zalophus californianus.**—Nature, Lond. **186**, 731. **901**

Long-term study on the general biology of this species provided evidence that degenerative diseases associating with aging were very common. Special study of the heart and aorta was therefore made in 70 animals from both sexes taken at random from 200 specimens. Lesions were found in aortae of three mature males and this is claimed to be the first report of such lesions in this species.

The lesions were those of an extensive active aortitis, with evidence of healing in some areas. The intima was not involved. The lesion was of the media and involved destruction of elastic tissue about the blood vessels and infiltration of plasma cells, macrophages and lymphocytes. The lesions are stated to resemble those of chronic human syphilis, but the aetiology in the sea lions is unknown.—R. N. Fiennes.

Dahme, E. (1960). Der Gestaltwandel der Lunge und arteriellen Lungenstrombahn bei Störungen des kleinen Kreislaufes. **[The pathology of disturbances of the pulmonary circulation.]**—Berl. Münch. tierärztl. Wschr. **73**, 333-336. [Summary in English.] **902**

Non-inflammatory thickening of the wall of the pulmonary artery and its branches in animals comprised two forms of hyperplastic change (of unknown aetiology in cats and associated with old age in horses), and three forms of arteriosclerosis associated with cor pulmonale in horse and dog, disseminated embolism in dogs, and chronic pulmonary emphysema in horses.—R.M.

Weiss, E. (1960). Zur Bewertung von Cholesterinablagerungen in der Lunge. **[Significance of cholesterol deposits in the lungs.]** —Berl. Münch. tierärztl. Wschr. **73**, 371-373. [Summary in English.] **903**

White sub-pleural spots due to interstitial thickening and fibrosis of the lung parenchyma are seen sometimes in cats, small fur-bearing animals, and rodents. They contain numerous foam cells, cholesterol crystals and giant cells. Somewhat similar lesions were produced in 5 cats and 15 rats by intratracheal administration of cholesterol, but they disappeared in 2–3 months. It was suggested that cholesterol is deposited during increased synthesis by the connective tissue, perhaps through irritation by *Pasteurella pseudotuberculosis* infection.—M.G.G.

Karsai, F. (1960). Über die Anwendung und Bedeutung der Leber-Clearance-Untersuchung in der Veterinärmedizinischen Diagnostik. **[The bromsulphalein liver clearance test in veterinary medicine.]** — Acta vet. Acad. Sci. hung. **10**, 263-280. **904**

Fellner, F. & Karsai, F. (1960). Beiträge zur Frage der Bromsulfaleinausscheidung und -resorption. **[Excretion and reabsorption of bromsulphalein.]** — Ibid. 281-294. [In German.] **905**

The average maximum excretion of bromsulphalein (BS) by the liver of horses during 10 min. of continuous infusion was 108·4 mg./min. This figure was reduced to 33·7 in a horse with mild CCl_4 poisoning and to 18·5 in a severe case. Although this method reliably detected liver damage it was too difficult for routine use.

Mean fractional clearance (K) averaged 0·308 in healthy horses and 0·213 in cattle. The mean half-time for disappearance of BS from the blood was 2·3 min. in horses and 3·3 min. in cattle. In animals with liver disease K was reduced to between 0·101 and 0·166 in horses and 0·071–0·115 in cattle. Determination of the K value was regarded as a practical means of diagnosing liver disease.

Experiments on sheep showed that 72% of intravenously administered BS was excreted during the first two hours in bile. Liver damage slowed the rate of excretion. Normally only about 1% was excreted in the urine, but in liver disorders this increased to 10%. The dye first appeared in urine 14–15

min. after injection. It was concluded that of various BS techniques the K method was least influenced by extra-hepatic factors.
—R.M.

Anderson, R. R. & Mixner, J. P. (1960). **I. Correction for hemolysis in a photometric method for assaying sulfobromophthalein in the blood of cattle in tests for hepatic function. II. Improved photometric method for assaying phenolsulfonphthalein in the blood of cattle in tests for renal function. III. Inulin renal clearance in dairy cattle.**—J. Dairy Sci. **43,** 1465-1470; 1471-1475 & 1476-1479. **906**

Refinements of technique permitted more accurate estimates of liver function and kidney function in cattle.—R.M.

POISONS AND POISONING

Hymas, T. A. & Mesler, R. J., Jr. (1960). **Effects of a synthetic nitrate concentrate administered orally to cattle.**—J. Amer. vet. med. Ass. **137,** 477-480. **907**

The authors prepared a solution of six nitrates, a nitrite and four other salts to simulate nitrate-contaminated drinking water. Two yearling cattle drenched with the equivalent of 737 or 928 mg./kg. body wt. of nitrate nitrogen died, while two others given 445 and 640 showed no signs of poisoning. No gross or histological lesions were found in 2 cattle allowed to drink normal amounts of water containing 0·4% of nitrate nitrogen for 90 days. Two cattle offered water containing 0·8% drank less than 3 gallons between them in 96 hours.—M.G.G.

Orstadius, K. (1960). **Toxicity of a single subcutaneous dose of sodium selenite in pigs.** —Nature, Lond. **188,** 1117. **908**

Muscular dystrophy in pigs is associated with a rise in plasma glutamic-oxaloacetic transaminase, but normal ornithine-carbamyl transferase. It can be prevented by addition to the diet of small doses (0·2 p.p.m.) of sodium selenite.

Sodium selenite was given s/c to pigs weighing 30–70 kg.: 2·0 and 1·2 mg. selenium per kg. body wt. caused death after 4 hours and 5 days respectively; plasma glutamic-oxaloacetic transaminase was significantly increased, but plasma ornithine-carbamyl-transferase was normal, indicating muscle but not liver was affected. At P.M. examination body musculature showed extensive dystrophy, other organs no significant changes. 0·9–1·1 mg. selenium per kg. body wt. caused moderate temporary elevation of transaminase in half the number of treated pigs, but did not cause disease. 0·8 mg. or smaller doses gave no increase of transaminase.

It is remarkable that while small doses of selenium have been shown to prevent muscular dystrophy, large doses cause muscle damage.
—E.V.L.

Johnson, D., Jr., Mehring, A. L., Jr. & Titus, H. W. (1960). **Tolerance of chickens for barium.**—Proc. Soc. exp. Biol., N.Y. **104,** 436-438. **909**

The lethal dose of barium (given by mouth as the hydroxide or acetate) for young growing chicks ranged from 467 to 779 mg. per kg. body weight. When the compounds were given continuously in the feed, chicks tolerated up to 0·1% of Ba without apparent ill effects, whereas 0·2% caused slight depression of growth; 0·8% fed over 4 weeks killed over half the chicks and 1·6 or 3·2% killed them all.
—R.M.

Coulston, F., Beyler, A. L. & Drobeck, H. P. (1960). **The biologic actions of a new series of bis (dichloroacetyl) diamines.** — Toxicol. appl. Pharm. **2,** 715-731. **910**

Three potential amoebicides belonging to this series were relatively non-toxic, but they temporarily suppressed spermatogenesis in rats, dogs and monkeys.—R.M.

Gourlay, R. N. & Harker, K. W. (1960). **Bersama abyssinica poisoning: the clinical and pathological picture.**—J. comp. Path. **70,** 464-474. [Authors' conclusions.] **911**

The leaves of the shrub *Bersama abyssinica* have been incriminated in the deaths of 3 cows in Uganda. Leaves were shown to be toxic to calves and rabbits following ingestion and to mice following subcutaneous and intraperitoneal injection of the leaf extract.

The clinical and pathological picture in cattle, rabbits and mice is essentially the same, comprising limb weakness leading to paralysis, hyperaesthesia, subnormal temperature, weak irregular pulse, irregular shallow respirations, trismus, nystagmus, opistothonos and spinal convulsions leading to death, generally within 24 hours. In rabbits in the early stages there is a period of intense sleepiness. The pathological picture consists of degenerative changes in the liver and kidneys.

It is suggested that the toxin is not a well known alkaloid or glucoside and that its primary action is on the spinal cord.

Diagnosis of poisoning due to this shrub is at present dependent on clinical history, clinical symptoms and the demonstration of leaf material in the rumen contents.

Bierer, B. W., Vickers, C. L., Rhodes, W. H. & Thomas, J. B. (1960). **Comparison of the toxic effects of Crotalaria spectabilis and Crotalaria giant striata as complete feed contaminants.** — J. Amer. vet. med. Ass. **136,** 318-322. **912**

Chicks fed ground *C. spectabilis* seeds as 0·01% of the ration for 7 weeks grew more slowly than control chicks, and a concentration of 0·1% caused 20% mortality. As 5% it caused deaths in pigs, sheep and cattle. Pigs, however, ate a ration containing 0·1% for 12 weeks without signs of ill health. *C. giant striata* as 5% of the ration was tolerated by pigs, sheep and cattle, but concentrations above 0·1% were harmful for chicks.—M.G.G.

Bierer, B. W. & Rhodes, W. H. (1960). **Corn cockle, cockleburs, and coffee beans as poultry ration contaminants.**—J. Amer. vet. med. Ass. **137,** 352-353. **913**

Chicks were fed seeds of *Agrostemma githago, Xanthium orientale or Cassia tora* as 5% of the ration for 5–6 weeks. No ill effects were seen, and P.M. findings were normal. —M.G.G.

Guarda, F. (1959). Studio istopatologico delle reazioni dei vasi encefalici nei polli nell'-avvelenamento sperimentale da E 605. **[Lesions in the blood vessels of the brain of fowls poisoned with parathion.]**—Ann. Fac. Med. vet. Torino **9,** 373-381. [Summaries in English, French and German.] **914**

In acute and in chronic parathion poisoning in fowls there was marked hyperaemia of the capillaries and arterioles in the brain; the small veins showed irregular dilatation. Hyperaemia was more intense in the medullary substance of the cerebellum than in any other sector of the brain. There was no anaemia or ischaemia. It is considered that hyperaemia was not the direct result of parathion toxicity, and therefore of cholinesterase inhibition, but rather the effect of complex physical phenomena immediately preceding death. —T.E.G.R.

Ross, E. & Sherman, M. (1960). **The effect of selected insecticides on growth and egg production when administered continuously in the feed.** — Poult. Sci. **39,** 1203-1211. [Authors' summary modified.] **915**

Seven insecticides, including Co-Ral, Dipterex, Diazinon, malathion, phenothiazine, ronnel, and Dow ET-15, were mixed into a standard all-mash laying ration at various levels and fed to laying hens and growing chicks for a 29-week period. Egg production, body weights, feed consumption, and mortality were recorded. Some of the materials were toxic, the effect being greater in the chicks. Sub-clinical toxicity as expressed in lower body weight and decreased egg production was also apparent. Ronnel and Dow ET-15 appeared to have little toxicity to both chicks and hens at the highest levels tested.

Edson, E. F. & Noakes, D. N. (1960). **The comparative toxicity of six organophosphorus insecticides in the rat.** — Toxicol. appl. Pharm. **2,** 523-539. **916**

The acute oral lethal doses for rats of Phenkaptone, demeton-methyl ("Metasystox"), dimethoate ("Rogor"), Diazinon and Dipterex ranged from 44 to 649 mg./kg., 14 to 200 times higher than the lethal dose of parathion. Dermal lethal doses ranged from 443 to 72,800 mg./kg. When the compounds were given in the food for 100 days they had no anti-cholinesterase activity at 1 p.p.m., or 5 p.p.m. in the cases of Phenkaptone and diazinon, or 125 p.p.m. in the case of Dipterex.—R.M.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

Golberg, L., Martin, L. E. & Smith, J. P. (1960). **Iron overloading phenomena in animals.** — Toxicol. appl. Pharm. **2,** 683-707. **917**

Distribution of iron in the body was studied after single or multiple i/m or s/c inj. of iron-dextran labelled with radio-iron into mice, rats, rabbits and dogs. A large number of large doses were needed to induce sarcoma in rats and mice: it was suggested that neoplasia was connected with prolonged reticulo-endothelial stimulation induced by iron-dextran.—R.M.

Tejerina, G. & Portolés, A. (1960). **A new factor in the use of antibiotics.** — Nature, Lond. **188,** 155-156. **918**

The antibacterial activity of kanamycin was inhibited by the serum of rabbits that had been inoculated with increasing doses of the antibiotic for one month. C.f. tests revealed specific anti-kanamycin antibodies.—M.G.G.

Mitscherlich, E. (1960). Untersuchungen über Höhe und Dauer des Penicillinblutspiegels bei Schafen nach Anwendung von zwei verschiedenen Depotpenicillinen. [**Penicillin concentration in blood of sheep after subcutaneous injection of benzathine penicillin and benethamine penicillin.**]—Berl. Münch. tierärztl. Wschr. **73,** 281-283. [Summary in English.] **919**

Groups of 5 or 6 sheep maintained a therapeutic concentration of penicillin in the blood of not less than 0·03 i.u./ml. for an average of 2 days after s/c injection of 8,000 i.u./kg. of benzathine penicillin, 6 days after 16,000 and 11 days after 24,000; 1 day after s/c injection of 5,000 i.u./kg. of procaine benethamine penicillin, 3 days after 10,000, and 6 days after 20,000.—M.G.G.

Buyske, D. A., Eisner, H. J. & Kelly, R. G. (1960). **Concentration and persistence of tetracycline and chlortetracycline in bone.**—J. Pharmacol. **130,** 150-156. **920**

These antibiotics persisted in bones of rats for a long time after oral, i/v or i/p administration. For example, specific fluorescence was seen in the whole skeleton 16 weeks after single i/p inj. of 250 mg./kg. tetracycline. Rats given feed containing 0·01% chlortetracycline over two years had concentrations of 19–35 μg./g. of bone while those fed 0·2% had 240–250 μg./g. of bone. —R.M.

Numans, S. R. & Kersjes, A. W. (1960). Toepassing van A.C.T.H. en corticosteroïden in de heelkunde der grote huisdieren. [**Use of corticotrophin and corticosteroids in large animals.**]—Tijdschr. Diergeneesk. **85,** 1419-1436. [In Dutch. Summaries in English, French and German.] **921**

At the Utrecht Veterinary Faculty six corticosteroid preparations were tried on 86 horses and 62 cattle with peritonitis, laminitis, tendovaginitis or arthritis. Results in bursitis were satisfactory, with the exception of navicular disease. The response of arthritis in horses appeared to be better than arthritis in cattle. Results in peritonitis and laminitis were not very good. The findings were compared with those of other authors.—R.M.

Semenov, L. P. (1960). [**Convocain benzoate for infiltration and nerve-block anaesthesia.**] —Veterinariya, Moscow No. 10 pp. 54-55. [In Russian.] **922**

This drug is prepared from the alkaloid convolamine obtained from *Convolvulus subhirsutus.* A 5% soln. had anaesthetic actions similar to 3% soln. of procaine when tried on horses.—R.M.

Jordan, F. T. W., Sanford, J. & Wright, A. (1960). **Anaesthesia in the fowl.**—J. comp. Path. **70,** 437-449. [Authors' conclusions modified.] **923**

Preliminary trials of 12 methods of anaesthesia in the fowl led to 4 being selected :— ether by inhalation; pentobarbitone intravenously; phenobarbitone intramuscularly followed by pentobarbitone i/v; and a mixture of chloral hydrate and magnesium sulphate (C.M.) given i/m and followed at once by pentobarbitone i/v.

Ether was reasonably satisfactory and produced deep anaesthesia with rapid induction and recovery, but an assistant is necessary for the continuous observation of respiration and for the control of the depth of anaesthesia. Pentobarbitone i/v in small doses induced a short period of anaesthesia; higher doses caused high mortality.

C.M. i/m, followed at once by pentobarbitone i/v, was the most satisfactory and was convenient and safe. In 30 out of 39 birds it produced deep anaesthesia lasting 30–60 min. after an induction period of 10 min. The i/m inj. caused slight muscle damage which did not interfere with the health of the bird.

No anaesthetic was found which gave prolonged anaesthesia in all cases and fundamental work on anaesthesia in the fowl is required.

Lowbury, E. J. L., Lilly, H. A. & Bull, J. P. (1960). **Disinfection of the skin of operation sites.** — Brit. med. J., October 8th, 1039-1044. [Authors' summary modified.] **924**

Test organisms *(Staph. aureus),* allowed to dry on areas of skin, were exposed to antiseptics. After 2 min. no test organisms were found in areas treated with 70% ethyl alcohol, with aqueous solutions of chlorhexidine (0·5%) with Lugol's iodine (1%), or with an iodophore (Virac). Appreciable numbers of

test organisms survived after treatment with 0·1% aqueous phenylmercuric dinaphthyl methane sulphate (Penotrane) and with 1% or 2% aqueous cetrimide.

Six antiseptics and a control were tested for their action in two minutes' treatment against "resident" skin flora by a hand-washing technique on seven subjects. Iodine in alcohol (1%) had approximately the same effect as chlorhexidine and these were much more effective than the other antiseptics tested. Chlorhexidine does not appear to cause sensitivity reactions, and therefore seems to be more suitable than iodine for routine use.

See also absts. **616** (disinfection against TB.); **617** (Aspergillus extract for treatment of TB.); **647** (brucellosis); **661** (neomycin); **688** (antibiotics against Mycoplasma gallinarum infection in fowls); **694** (antrycide and prothidium bromide); **695** (homidium); **700** (oxytetracycline against ovine coccidiosis); **703** (dinitro-o-tho-toluamide against avian coccidiosis); **704** (vitamin A in avian coccidiosis); **708** (chemotherapy of bovine theileriasis); **798 801, 803-804, 914-916** (parasiticides); **808-812, 820, 831 & 836** (anthelmintics); **979** (book, anaesthesia); **980** (international pharmacopoeia).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

Comfort, A. (1960). **Longevity and mortality in dogs of four breeds.**—J. Geront. **15**, 126-129. **925**

C. analysed data concerning Pekingese, Cocker Spaniel, English Mastiff and Irish Wolfhound dogs, derived from records of breeders and of the Kennel Club of Great Britain. The life span of the large breeds was considerably shorter than that of Pekingese and Spaniels.—R.M.

Findlay, J. D. & Jenkinson, D. McE. (1960). **The morphology of bovine sweat glands and the effect of heat on the sweat glands of the Ayrshire calf.** — J. agric. Sci. **55**, 247-249. [Authors' summary modified.] **926**

The normal sweat glands of 28 calves, 19 live adult cattle and 18 slaughtered cattle from temperate breeds were examined. In every animal the lumen of the sweat glands contained a fluid-like material.

It appeared on examination and rough measurement that the sweat glands taken from animals after slaughter were smaller than those from live animals even when the same sampling technique was used.

The sweat glands of 16 calves were examined before and at intervals after the animals had been subjected to a hot environment. The glands were always seen full of a fluid-like material.

It is concluded that if the calf sweat gland is stimulated by heat stress it must function either (a) by simple diffusion through the sweat gland wall and hence to the skin surface, or (b) by a secretory process not involving degeneration of the glandular epithelium. It is probable that at least part of the contents of the lumen of the sweat glands is derived from the epithelium by a process of active secretion.

Denington, E. M. & Lucas, A. M. (1960). **Influence of heat treatment on the number of ectopic lymphoid foci in chickens.**—Amer. J. vet. Res. **21**, 734-739. [Authors' summary modified.] **927**

The rectal body temperature of the White Leghorn chicken rises from an average of 104·2°F. one day after hatching to 107·6°F. at 29 days of age. Values at different laboratories for the eighth day varied from 104·2° to 107·2°F.

When chickens, 1 to 16 days old, were subjected to three to nine heat treatments, each consisting of a 45-min. exposure to an external temp. of 108° to 110°F., the number of lymphoid areas was less than in controls. For the pancreas, the average numbers were 4·37 to 5·07, compared to 7·4 for a constant sample area (a significant difference). For the liver, average numbers were 3·05 to 3·63, compared to 4·04 (non-significant).

These data support a previous hypothesis that ectopic lymphoid foci are a result of defence reactions by the body but are not ontogenetically normal structures of the bird, although commonly present.

Blaxter, K. L. & Wainman, F. W. (1960). **The effect of environmental temperature on the energy metabolism of steers.** — Proc. Nutr. Soc. **19**, No. 2. pp. xvi-xvii of Abstracts. **928**

Measurements of energy exchange and heat loss partition were made on two steers kept in a closed circuit respiration chamber in which the walls and circulating air were cooled or heated by brine. The experiments lasted at least 4 days and were conducted with the steers on a maintenance ration of hay and oats at environmental temperatures of −5, 4, 15, 25 and 35°C., and on a sub-maintenance ration of hay at −5 and 20°. Environmental temperature had small effects on the energy lost in the faeces and as methane but none on the energy lost as the heat of combustion of urine solids. Heat production increased below 7° and there were large falls

in energy retention at – 5 and 4°. Losses of heat per unit surface by convection, conduction and radiation were unaffected by level of nutrition. The total thermal conductances of the steers below their critical temperature were 50·6 ± 0·7 and 48·1 ± 0·5 Kcal/m²/24hrs./°C. —E. J. CASTLE.

Aalund, O. & Nielsen, K. (1960). **Determination of standard bicarbonate in blood. Investigations on the acid-base metabolism in cattle and swine.**—Nord. VetMed. **12,** 605-620. [In English. Summaries in German and Danish. Authors' summary modified.] **929**

The normal values of standard bicarbonate in 116 adult cows and 57 pigs (body weight about 90 kg.) were 19–27 meq per litre and 18–27 meq/l. respectively.

During measurements of standard bicarbonate in cattle stunned by a captive-bolt pistol a remarkable decrease of standard bicarbonate and an equally remarkable increase of the blood concentration of lactic acid occurred during the interval between stunning and bleeding—an interval lasting usually 3–5 min.

Four adult cows were each treated with 2 litres of isotonic sodium bicarbonate solution, inj. i/v in about 5 min. The infusion was followed by a considerable increase of standard bicarbonate, but this returned to normal within an hour.

Standard bicarbonate was estimated in various pathological conditions in cattle and pigs, including ketosis and milk fever.

Tverskoy, G. B. (1960). **Influence of cervical sympathectomy and pituitary stalk section upon milk secretion in goats.**—Nature, Lond. **186,** 782-784. **930**

The cervical sympathectomy was performed in 2 stages at an interval of 1 month, either the stellate ganglia or a section of the vertebral nerve was removed from each side. Unilateral cervical sympathectomy produced a moderate decrease in milk secretion of short duration; complete removal reduced the secretion to 59% of the initial level in the first 10 days, a very slow increase in yield followed but this did not equal that of the control animals.

Section of the pituitary stalk which was complete in 2 animals reduced the milk yield to 29% in the first post-operative month. An animal in which the median eminence was also damaged, gave only 10%. Incomplete section in 3 goats resulted in 40% yields, compared with a 50% yield in control operated animals. With exception of the goat with the damaged median eminence, yields increased slowly throughout the 80 day post-operative period.—JOYCE E. HAMMANT.

Sonoda, M. (1960). **Clinical and experimental studies on the erythrocytes which include Jolly's bodies in horses.**—Jap. J. vet. Res. **8,** 1-11. [In English.] **931**

Howell-Jolly bodies were present in an average of 10·1 per 100,000 erythrocytes in 170 clinically healthy horses and in 18·7 per 100,000 in 42 horses with infectious anaemia. The erythrocytes with Jolly bodies differed in no other way from normal erythrocytes and contained no supra-vitally stainable material. In a colt made anaemic by exsanguination, there was a slight increase in the number of erythrocytes with Jolly bodies during the period of most active regeneration. In the bone marrow of horses with infectious anaemia, erythrocytes with Jolly bodies were slightly more numerous than in the peripheral blood. About 2·5% of erythroblasts contained Jolly bodies.—A. ACKROYD.

Goetz, R. H., Warren, J. V., Gaver, O. H., Patterson, J. L., Doyle, J. T., Keen, E. N. & McGregor, M. (1960). **Circulation of the giraffe.**—Circ. Res. **8,** 1049-1058. **932**

In four giraffes both right and left heart were catheterized under local anaesthesia with a miniature manometer: arterial blood pressure was high by human standards and was adequate to maintain cerebral perfusion. The pulse wave indicated a relatively lax vascular bed with considerable reserve distensibility. Values for cardiac output and blood volume were roughly comparable to those recorded in domestic cattle of about the same weight.—R.M.

Wolin, M. J. (1960). **A theoretical rumen fermentation balance.** — J. Dairy Sci. **43,** 1452-1459. [Part of author's summary.] **933**

Certain assumptions are made which permit the calculation of the amounts of CO_2 and CH_4 produced in the rumen which correspond to a given molar distribution of volatile fatty acids present in rumen fluid. This calculation allows the development of a theoretical fermentation balance for a given molar distribution of volatile fatty acids.

The balance was used to amplify interpretion of data concerned with variations in the molar distribution of fatty acids on various diets.

Newberne, J. W., Robinson, V. B., Estill, L. & Brinkman, D. C. (1960). **Granular structures in brains of apparently normal dogs.**—Amer. J. vet. Res. **21**, 782-786. [Authors' summary modified.] **934**

In a survey of 30 dogs that were at least 4 years of age, spherical, eosinophilic, granular structures were found in the medulla of 12. In previous examinations, these structures were seldom found in dogs less than 1 year of age. A critical histological and histochemical study of the structures found in 13 of 15 clinically normal dogs, at least 5 years old, indicated that they were degenerating axis cylinders having no neurological or pathological significance. No explanation of the genesis can be given. It is suggested that, since the number of degenerating axis cylinders increases with age, they are probably a non-specific defect of aging.

Huggins, C. & Okamoto, R. (1960). **Disturbed reproductive function following section of the portal vein.** — J. exp. Med. **112**, 883-894. [Authors' summary modified.] **935**

Integrity of the portal vein is a condition for normal function of the reproductive tract in female rats. Section of the portal vein always abolished periodic sexual function. Six of 23 animals developed continuous oestrus and other signs of excess of oestrogenic hormones; yet the ovaries of these rats were small. In 6 other rats there was growth of the prostate and other evidence of increased activity of androgenic hormones. Many rats failed to become pregnant and nearly all pregnant rats aborted. Except for a decrease in lipid content, the composition of the liver resembled that of intact rats.

Rapid passage of blood through the liver is necessary to conjugate the excessive amounts of steroids which the rat ovary normally produces and an intact portal vein is essential for their partial inactivation.

Nagra, C. L., Baum, G. J. & Meyer, R. K. (1960). **Corticosterone levels in adrenal effluent blood of some gallinaceous birds.**—Proc. Soc. exp. Biol., N.Y. **105**, 68-70. [Authors' summary modified.] **936**

A method is described for obtaining samples of adrenal venous blood from birds. Levels of corticosterone, expressed as μg.%, in adrenal effluent and peripheral plasma were 42·4 and 7·8 in turkeys and 34·8 and 8·6 in pheasants. In domestic fowl the values were 44·3 and 7·3 in Wisco Whites; 48·8 and 12·3 in New Hampshires, and 37·0 and 9·5 in White Rocks. ACTH (8 I.U. intravenously) increased the output of corticosterone from 29·6 to 104·6 μg.% in pheasants and from 30·7 to 143·7 μg.% in chickens 60 min. after injection.

Mixner, J. P. & Lennon, H. D., Jr. (1960). **Efficiency of absorption of thyroxine in various forms from the gastrointestinal tracts of lactating cows.**—J. Dairy Sci. **43**, 1480-1489. [Part of authors' summary.] **937**

One of the important causes of animal variation in lactational (or other) responses to orally administered thyroidal materials may be the differences in efficiency with which the materials are absorbed from the digestive tract.

Nishida, T. (1960). **[Comparative and topographical anatomy of the fowl. II. Blood vessels of the thoracic limb. Part 1: arteries.]** —Jap. J. vet. Sci. **22**, 223-231. [In Japanese. Summary in English.] **938**

There are four plates of illustrations with a table of captions in Latin.—R.M.

Akester, A. R. (1960). **The comparative anatomy of the respiratory pathways in the domestic fowl (Gallus domesticus), pigeon (Columba livia) and domestic duck (Anas platyrhyncha).** — J. Anat., Lond. **94**, 487-505. **939**

Rubber latex casts of the respiratory system of 20 fowls, 12 pigeons and 6 ducks were made. They are shown in six plates of photographs. One of the author's findings was that there were two groups of secondary bronchi, not four. Connexions of the air sacs to the lungs were described. So-called recurrent bronchi were probably absent in adult birds.—R.M.

Shelley, H. J. (1960). **Blood sugars and tissue carbohydrate in foetal and infant lambs and rhesus monkeys.** — J. Physiol. **153**, 527-552. **940**

Foetal lambs and monkeys near term are well provided not only with liver glycogen but also with cardiac and skeletal muscle glycogen. Cardiac glycogen is depleted in anoxia and a relationship between cardiac carbohydrate and resistance to anoxia has been observed in both species. The exceptionally high content of glycogen in skeletal muscle of full-term foetuses constitutes a carbohydrate reserve for use during the first few days after birth; the total amount of carbohydrate lost from skeletal muscle after birth is considerable, 2–3 times the total amount present in the liver.—R.M.

Planas, J. & de Castro, S. (1960). **Serum iron and total iron-binding capacity in certain mammals.** — Nature, Lond. **187,** 1126-1127. **941**

The species studied were man, pig, cattle, sheep, donkey, horse, mule and goat. Statistical analyses indicated no sex or species differences in serum iron whereas total iron-binding capacity did differ between the species. The highest value was in the pig at 476·8 μg.% and the lowest in the donkey and mule at 263 μg.% and 284 μg.% respectively. These differences were attributed to either quantitative variations of a definite siderophilin or the existence of specific siderophilins.

—Joyce E. Hammant.

LIVESTOCK HYGIENE

Anon. (1960). **A bibliography of farm buildings research, 1945-1958. Part III. Buildings for poultry.** pp. 84. London: Agricultural Research Council. 4s. 6d. **942**

An annotated bibliography of 348 references drawn from world literature.

—R.M.

Clarke, E. M. W. (1960). **A new unit for infected small animals.**—J. Anim. Tech. Ass. **11,** 27-30. **943**

A description of the construction, heating, ventilation, equipment and management of a self-contained unit for infected animals, containing 6 animal rooms, 15 feet by 10 feet, and 8½ feet high, 2 store rooms, 2 sterilizing rooms and a post-mortem room. Cleaning is simple, as the animal rooms and sterilizing rooms have sloping floors with separate drains, and the animal cages are on racks hanging from the ceiling.—M.G.G.

REPRODUCTION AND REPRODUCTIVE DISORDERS

Netherlands. (1960). Jaarverslag k.i. 1959 inhoudende het 14e jaarverslag van de Centrale Commissie van toezicht op de uitvoering van de k.i. in Nederland en het 9e jaarverslag van de federatie van provinciale bonden van verenigingen voor k.i. bij rundvee in Nederland. **[Annual report on artificial insemination for 1959.]** pp. 112. Utrecht: Centrale Commissie van de K.I. [Summaries in English, French and German.] **944**

The supervision of A.I. in the Netherlands is to be transferred to the Ministry of Agriculture and Fisheries. According to draft regulations printed at the back of this report, no person may artificially inseminate an animal unless he is a veterinary surgeon or an approved inseminator.

During 1959, 1,216 bulls of 3 breeds were used to inseminate 1,085,190 cows. Deep-frozen semen was used from 34 of the bulls. Conception rate after first insemination was 60·6% and the total conception rate was 91·3.

With 551,600 inseminations made by the rectal technique, 61·9% of the cows conceived while after 123,580 inseminations made by the vaginal technique 60·5% conceived. The difference was not regarded as significant.

The number of goats inseminated was 1,417 and 53·6% conceived after the first insemination; the total percentage that became pregnant was 75·2. It is used in four provinces: Overijssel, Gelderland, Utrecht and North Holland. The report contains notes on the effect of nutrition on sperm quality.

Pigs were inseminated in five provinces: Overijssel, Utrecht, Limburg, South Holland, North Brabant. A total of 3,207 of 4,655 became pregnant (68·9%), 2,362 of them after first insemination.—R.M.

Dukelow, W. R., Frederick, E. C. & Graham, E. F. (1960). **Frequency of ejaculation in the bovine.** — J. Dairy Sci. **43,** 1335-1339. [Authors' summary.] **945**

Data from one set of monozygotic triplet Holstein bulls indicated that at least seven successive ejaculates could be collected once each week for at least a year with no detrimental effects on semen quality or libido. The bulls giving four and seven ejaculates per week produced 2·4 and 3 times as many spermatozoa as the bull giving two ejaculates per week.

Additional data from one set of monozygotic triplet and three sets of monozygotic twin Holstein bulls indicated that the collection of two ejaculates every two days or four days for a period of 2 years did not result in appreciable loss in libido, or semen quality as compared to bulls giving two ejaculates every seven days. Bulls giving two ejaculates every two and four days produced 2·1 and 1·2 times as many spermatozoa as bulls giving two ejaculates once every seven days.

Campbell, R. C., Hancock, J. L. & Shaw, I. G. (1960). **Cytological characteristics and fertilizing capacity of bull spermatozoa.**—J. agric. Sci. **55,** 91-99. **946**

In 257 ejaculates from one Guernsey, 5 Friesian and 7 Hereford bulls, cytoplasmic beads and bent tails were the most frequent abnormalities of spermatozoa whilst the mean percentage of dead spermatozoa was 21·0. Nine morphological classes of spermatozoa were estimated in nigrosineosin stained preparations and in fixed wet preparations, the latter being found the more reliable. Frequencies of all abnormalities differed significantly between ejaculates within bulls; all except broken necks differed between bulls within breeds and frequencies of 5 abnormalities differed between Friesian and Hereford bulls. Frequencies of bent tails, coiled tails and dead spermatozoa declined significantly with order of ejaculate. There were positive within-bull correlations between the frequencies of malformed and free heads and conception rates, but a negative between-bull correlation of differences in fertility with the frequency of neck beads.

—A. Ackroyd.

Chieffi, A. & Reis, J. M. (1960). Richerche su nuovi mestrui diluitori del materiale seminale di toro. IV. Modificazioni della tecnica di preparazione del mestruo tuorlo d'uovo-succo di pomidoro (Geto). **[Diluents for bull semen. IV. Modification of the egg yolk-tomato juice diluent.]** — Zootec. e Vet. **15,** 61-62. [Summary in English.] **947**

The modified diluent consists of 4 parts tomato juice and 1 part egg-yolk. Glycerol up to 10% is added and the pH is adjusted to 6·8. It is clearer (facilitating the examination of semen) and is a better preservative. [See also *V.B.* **29,** 3396].—T.E.G.R.

I. Fallon, G. R. & Crofts, J. M. (1960). **Some aspects of oestrus in cattle, with reference to fertility on artificial insemination. 2. Crystallisation patterns in cervico-vaginal mucus.**—Qd J. agric. Sci. **16,** 431-437. **948**

II. Fallon, G. R. (1960). **Some aspects of oestrus in cattle, with reference to fertility on artificial insemination. 3. Body temperature and the oestrous cycle.**—Ibid. 439-447. **949**

I. By using crystallization patterns of cervical mucus as criteria, strong evidence of oestrogenic activity was obtained in 32·5% of observations made within five days of an observed oestrus. In samples which could not readily be related to an observed oestrus, some 47·8% of the patterns reflected pronounced oestrogenic influence.

II. The mean body temperature was 100·2°F. in the morning and 101·4° in the evening. A thermal response to oestrus was noted although no correlation between body temp. and the stage in the cycle could be established. It is suggested that temperature could be used as an adjunct in oestrus detection.—R. G. Wales.

Howes, J. R., Warnick, A. C. & Hentges, J. F. (1960). **Comparison of different methods for detecting ovulation in cattle.**—Fertil. & Steril. **11,** 508-517. **950**

Three methods compared on 12 Hereford and 12 zebu virgin heifers were sexual behaviour, vaginal temperature, and crystallization pattern of cervical mucus. The cervical mucus crystallization was the best method but it only detected 81% of ovulations.

Zebu cattle had a much lower rate of ovulation than Herefords, and in them it appeared to be suppressed during autumn and winter in Florida.—R.M.

Madden, D. H. L. (1960). **Pig A. I.** — Vet. Rec. **72,** 885-886. **951**

Artificial insemination exclusively of pigs which stood firmly to be mounted gave farrowing rates of up to 83%.—M.G.G.

Lamond, D. R. (1960). **Seasonal differences in ovulating hormone in the Merino ewe.**—Nature, Lond. **186,** 971-972. **952**

Thirty-one Merino ewes were subjected to synchronized ovulation with 10 mg. progesterone daily for 14 days followed by 500 i.u. pregnant mare serum subcutaneously and 48 hours later 300 or 900 i.u. human chorionic gonadotrophin either intramuscularly or *via* the peritoneum. The group treated with 300 units in October ovulated 20 hours later than a similar group so treated in the Australian breeding season, April, suggesting that less endogenous ovulating principle (luteinizing hormone) was present in October.

—F. L. M. Dawson.

Lamming, G. E. & Heap, R. B. (1960). **Studies of the uterine environment of different species. II. The influence of ovarian hormones on experimental uterine infections.** — J. Endocrin. **20,** No. 4. pp. xxiv-xxv of Proceedings. **953**

The differences in uterine bactericidal activity observed in the rabbit were not apparent in the rat. Similar work on the sheep

revealed considerable resistance to organisms in both phases, but this was greater during oestrus and in spayed sheep receiving oestrogens. Chemical analysis of the uterine secretion of the different species showed a close correlation between susceptibility to infection and the presence of an "acid-soluble fraction", described earlier by these authors [*J. Endocrin.* **20,** xxiii]. Evidence suggests this fraction may inhibit leucocyte infiltration.
—F. L. M. Dawson.

Ashida, K. (1960). **[Studies on ovarian disorders in the dairy cow. I. Inactivation of oestrogen by liver.]**—Bull. Nat. Inst. Anim. Hlth, Tokyo No. 39 pp. 51-58. [In Japanese. Summary in English.] **954**

Since an adequate protein intake is essential to maintain the liver's function as an inactivator of oestrogen, liver failure might lead to reproductive endocrine disorders. A technique was devised and tested for measuring efficiency of inactivation by liver. Biopsy samples of 1 g. of liver were taken with a cannula-type instrument inserted between the 11th and 12th ribs 25–30 cm. from the dorsal midline; 400 mg. of sliced tissue were incubated for an hour with 3 μg. oestrone in 10 ml. phosphate buffer and the oestrogen still active measured by rat uterine weight and mouse vaginal smear tests. The livers of all 5 heifers tested appeared to show inactivating power and the between-animal variation was roughly the same by both bio-assay methods.
—F. L. M. Dawson.

I. Ashida, K., Hayashi, M. & Sugimura, K. (1960). **[Studies on ovarian disorder in the dairy cow. II. Effect of sex hormones on ovarian function and lactation.]**—Bull. Nat. Inst. Anim. Hlth, Tokyo No. 40 pp. 1-17. **955**

II. Ashida, K. & Asahi, O. (1960). **[Studies on ovarian disorder in the dairy cow. III. Effect of experimental liver dysfunction on sexual function.]** — Ibid. pp. 19-27. [In Japanese. Summary in English.] **956**

I. The relationship between ovarian function, lactation and inactivation of oestrogen by the liver was studied in 5 maiden heifers, after successive injection of oestrogen in increasing quantities from 2 x 10^5 i.u. to 4 x 10^5 i.u., followed by a single implantation of 50 mg. progesterone. In 3 animals, development of the udder and milk secretion occurred during treatment with oestrogen and cystic ovaries developed after the implantation. The liver of these animals had a high rate of oestrogen inactivation, contrary to that found in the remaining heifers where no lactation was induced and only one developed a cystic ovary.

II. Normal young adult rats were injected with carbon tetrachloride (CCl_4) to induce liver damage and in most of these rats, oestrous cycles were suspended during or shortly after injection. A few continued with irregular cycles.

In one cow that already had severe liver damage the follicles became enlarged during a course of CCl_4 injections and 2 of 3 animals with slight liver damage developed cystic follicles during oestrogen treatment whereas the third remained unaffected. It was concluded that the effect of similar doses of oestrogen depended on the degree of liver damage.—Joyce E. Hammant.

Bryan, H. S. (1960). **Utility of 17 α-acetoxyprogesterone in delaying estrus in the bitch.** — Proc. Soc. exp. Biol., N.Y. **105,** 23-26. [Author's summary modified.] **957**

This compound successfully inhibited oestrus during 17 months when incorporated in dog feed at a conc. of 22 mg./kg., giving a minimum dose of 2·5 mg./kg. body wt. daily. When administered once daily by mouth as a suspension, a dose of 4 mg./kg. body wt. was required. Examination of ovaries of treated dogs revealed inhibition of development of vesicular follicles. Bitches previously treated with the drug returned to cycle, were bred and whelped normal, healthy litters of puppies. It was suggested that bitches be bred no sooner than 6 months after cessation of treatment to ensure maximum fertility. The drug was judged completely safe for dogs.

Adams, C. E. (1960). **Embryonic mortality induced experimentally in the rabbit.** — Nature, Lond. **188,** 332-333. **958**

The uterine horns of 14 pregnant rabbits were exposed between the 7th and 17th days of pregnancy, and the uterine wall and underlying membrane at 71 selected uterine swellings were incised to allow fluid to escape from the embryos. On the 28th day P.M. examination revealed no live foetuses at treated sites, and all except one appeared to have died shortly after the operation.—M.G.G.

Helmreich, R. L. (1960). **Regulation of reproductive rate by intra-uterine mortality in the deer mouse.**—Science **132,** 417-418. **959**

Twenty mating pairs of *Peromyscus maniculatas bairdii* were kept under crowded

conditions for 3 weeks (4 pairs per cage). In females, the number of developing embryos at the end of this period was 60% less than in controls (one pair per cage), although there was no significant difference in the number of implantation sites. The adrenal glands of crowded females were 17% heavier than those of control females.—M.G.G.

Karg, H. & Kronthaler, O. (1960). Histometrische Untersuchungen am hormonproduzierenden Interstitialgewebe von Hoden kryptorchider Tiere. [**Cell dimensions in the interstitial tissue of the testicles of cryptorchid stallions, boars, dogs and cats.**] — Zbl. VetMed. **7**, 595-604. [Summaries in English, French and Spanish. English summary modified.] **960**

In 56 testicles of normal rats, cats, dogs, pigs and horses, the authors studied quantitatively the interstitial tissue and the size of the nuclei of the Leydig cells. The results in comparison with the testicles of animals with unilateral cryptorchidism show that the relative increase of interstitial tissue in the dystopic testicle is not sufficient to compensate for the loss in weight of the organ. The diminished volume of the nuclei showed that the capacity of the Leydig cells to secrete androgenic hormones is depressed. This suggests that as a result of testicle dystopy the potential action of interstitial cell stimulating hormone on the receptor cells is inhibited.

Uray, H. (1960). Fehler in der hormonalen Steuerung als Sterilitätsursache beim weiblichen Rind. [**Hormonal failure as cause of sterility in cows and heifers.**] — Wien. tierärztl. Mschr. **47**, 696-705. [Summaries in English, French and Italian.] **961**

Of 43 cattle with persistent anoestrus, 39 came into heat after injections of pregnant mares' serum. Of 44 animals with persistent oestrus that were inoculated with pregnant mares' serum or chorionic gonadotrophin before artificial insemination, 13 returned for a second insemination, and 3 for a third. Of 22 cows with ovarian cysts, 15 became pregnant to first or second insemination after rupture of the cysts and treatment with chorionic gonadotrophin.—M.G.G.

Donaldson, L. E. & Aubrey, J. N. (1960). **Posthitis and prolapse of the prepuce in cattle.**—Aust. vet. J. **36**, 380-383. [Authors' summary modified.] **962**

The condition was observed in 25 bulls and one steer. The incidence is highest in bulls in which the inner preputial layer of soft epithelium is allowed to protrude from a large uncontrolled prepuce. Treatment with antibiotics before prolapse, or surgery afterwards, was fairly satisfactory. A surgical technique to remove the inflammatory tissue and retain as much of the internal layer of the prepuce as possible is described. It is considered that the condition is mainly traumatic in origin and not related to non-contagious ovine posthitis. The only practical control appears to be by selection of bulls with a small prepuce and with the ability to retract the inner preputial lining.

Binns, W., Anderson, W. A. & Sullivan, D. J. (1960). **Further observations on a congenital cyclopian-type malformation in lambs.** — J. Amer. vet. med. Ass. **137**, 515-521. [Authors' summary modified.] **963**

A congenital cyclopian malformation in 116 lambs varied in severity from a shortened upper jaw with distorted nostrils to a single median eye with a fluid-filled, thin-walled vesicle as the forebrain and with no pituitary body. The condition does not appear to be hereditary but may be caused by some substance ingested by the ewes early in pregnancy.

See also absts. **609** (anthrax bacilli in an aborted calf foetus); **642** (brucella in horse semen); **643-648** (brucellosis); **651-652** (leptospiral abortion in pigs); **656-657** (abortion due to brucellosis and vibriosis); **658** (listeria and salmonella as cause of abortion in cows).

ZOOTECHNY

Henderson, A. E. & Hayman, B. I. (1960). **Methods of analysis and the influence of fleece characters on unit area wool production of Romney lambs.** — Aust. J. agric. Res. **11**, 851-870. [Authors' summary modified.] **964**

Using four groups of lambs, each on a different nutritional level, the authors studied the influence of fibre number per unit area (N), cross-sectional area of fibre (A), and fibre length (L) on wool production per unit area of skin (W). The influence of fibre volume (V) and proportion of skin area occupied by the fibre (O) was also considered.

Slightly more than three-quarters of the variation in W between groups was due to variation in L, while effects of N and A were negligible. No evidence was found that the relative influence of the components changed

with level of production. Differences in W between lambs on the same nutritional level were influenced almost equally by N and L, while A had a negligible effect.

Of the variation in W between positions on lambs about 50% was accounted for by N, 40% by A, and 10% by L; nearly 90% was accounted for by O.

Combs, B. O. (1960). **Program for specific pathogen free (SPF) pigs in Iowa.**—Allied Vet. **31**, 108-112. **965**

Since July 1959, twenty farms in Iowa have been restocked with 500 piglets obtained by hysterectomy and reared in units free from pathogens. They are immunized against swine fever with lapinized virus and immune serum at the age of 3½ weeks, and are taken to the farms as soon as they are accustomed to dry feed.—M.G.G.

Anon. (1960). **Hens can get too much light too soon.**—Agric. Res. Wash. **9**, No. 4 p. 7. **966**

R. W. Lowe found that chickens exposed to 16 hours of light daily from hatching to 14 weeks, then 8 hours daily until 20 weeks had inferior body and feather development and began laying 4 weeks later than chickens exposed to 8 hours of light daily to 14 weeks, followed by 16 hours daily until 20 weeks. —M.G.G.

DeValois, D. G. (1960). **Problems associated with the transportation of monkeys.**—Ann. N.Y. Acad. Sci. **85**, 752-757. **967**

Gisler, D. B., Benson, R. E. & Young, R. J. (1960). **Colony husbandry of research monkeys.**—Ibid. 758-768. **968**

Ayres, P. E., Hook, A. E., MacMillan, R. L. & Kowalewski, H. V. (1960). **Care of the large monkey colony.**—Ibid. 769-776. **969**

Fegley, H. C. & Sauer, R. M. (1960). **Mass treatment of monkeys with antibacterial substances.**—Ibid. 777-784. **970**

Graham, G. L. (1960). **Parasitism in monkeys.** —Ibid. 842-860. **971**

Sauer, R. M. & Fegley, H. C. (1960). **The roles of infectious and noninfectious diseases in monkey health.**—Ibid. 866-888. **972**

Cohen, D. W. & Goldman, H. M. (1960). **Oral disease in primates.**—Ibid. 889-909. **973**

Twenty-six papers have been published under the title "Care and diseases of the research monkey" as Article 3 of volume 85 of the Annals of the New York Academy of Sciences. In addition to the titles shown above, there are four papers on B virus infection, and one each on a pox disease, enteric bacteria, neoplasms, electrocardiography, haematology, estimation of age, and other subjects.

Fegley and Sauer tried adding various antibiotics and nitrofurans to the drinking water to control respiratory and enteric infections. Losses from respiratory infections were reduced by using as drinking water a 1 in 33 soln. of "Polyotic" (tetracycline), while tetracycline plus neomycin was effective against enteric infections. The latter could also be controlled by adding furazolidone to the food to give a concentration of 0·02%.

Pathogenic parasites mentioned by Graham included *Oestophagostomum, Strongyloides, Trichuris;* various trematodes and cestodes; *Pneumonyssus* mites; intestinal protozoa.

Sauer and Fegley studied the incidence of disease in a colony of about 2,000 monkeys of three species at a pharmaceutical lab. The four major diseases were bronchopneumonia, gastro-enteritis, malnutrition and "stress". Pathology of the conditions was described and illustrated.

Oral diseases dealt with by Cohen and Goldman included dental caries, periodontal disease and neoplasms (12 cases found by searching the literature); there are 14 illustrations.—R.M.

TECHNIQUE AND APPARATUS

Stanworth, D. R. (1960). **A rapid method of preparing pure serum gamma-globulin.** — Nature, Lond. **188**, 156-157. **974**

All proteins other than 7*S*-type gamma-globulins were removed from serum by adding to diethyl amino ethyl cellulose and buffer, and centrifuging.—M.G.G.

Davey, L. A., Cheeseman, G. C. & Briggs, C. A. E. (1960). **Evaluation of an improved artificial rumen designed for continuous control during prolonged operation.** — J. agric. Sci. **55**, 155-163. [Authors' summary modified.] **975**

An artificial rumen is described which simulates closely conditions in the bovine rumen. Criteria of its validity include quantitative and qualitative bacteriological data, volatile fatty acid production, pH levels and digestion rates; these were examined with a variety of diets using as controls cows on

similar diets. An important feature of the apparatus is the high degree of control which can be exercised over the progress of the *in vitro* ruminal fermentation, permitting experiments of considerable duration.

Epstein, S. S. & Weiss, J. B. (1960). **Measuring the size of isolated cells.**—Nature, Lond. **187,** 461-463. **976**

Techniques using ocular graticules, spot scanning, and double-image microscopy measure only the cross-sections of cells. Cell volume, however, can be measured by the difference in electrical conductivity between cell and suspending fluid.—M.G.G.

Stuart, A. E. (1960). **Chemical splenectomy.** —Lancet, October 22nd, 896-897. [Author's summary.] **977**

Ethyl palmitate administered intravenously suppresses phagocytic function and causes destruction of the spleen. The bone-marrow and lymphoid tissue of the thymus are unaffected.

See also absts. **623** (growth of M. johnei on solid media containing vitamin K); **673** (fluorescent antibody staining of Sporotrichum schenckii).

REPORT

Nguyen-Van-Ai. (1960). Republic of Viet-Nam. Institut Pasteur du Viet-Nam. Rapport annuel sur le fonctionnement technique. **[Annual report of the Pasteur Institute of Viet-Nam for 1959.]** pp. 164. Saigon: The Institute. **978**

MELIOIDOSIS caused orchitis in a boar imported from an un-named country. It was stated that similar cases have been encountered in Cambodia. *Pfeifferella whitmori* remained virulent for g.pigs after 12 successive freezings and thawings; biochemical properties and bacteriophages of the organism were studied. BRUCELLOSIS caused abortion in imported Berkshire pigs. A strain of *Br. suis* was isolated and its properties are given. LEPTOSPIROSIS caused an epidemic of abortion among pigs at an experimental station.

RINDERPEST formolized tissue vaccines were studied by M. Huard: three adjuvants (aluminium hydroxide, saponin and "Arlacel") gave equal results when compared in immunization experiments with 30 buffaloes. Freeze-dried rinderpest virus survived for 15 days at 29°C. and 3 months at 4°C.

FOWL POX virus cultured in chick embryos retained its immunizing potency for four weeks at ambient temperature or 5 months at 4°C. when Nakamura's diluent (glycerin, whole-egg and phenol) was used. R. Netter prepared a drinking-water vaccine against NEWCASTLE DISEASE. Tissue culture of N. D. virus was studied by J. André and G. Audebaud.—R.M.

BOOK REVIEWS

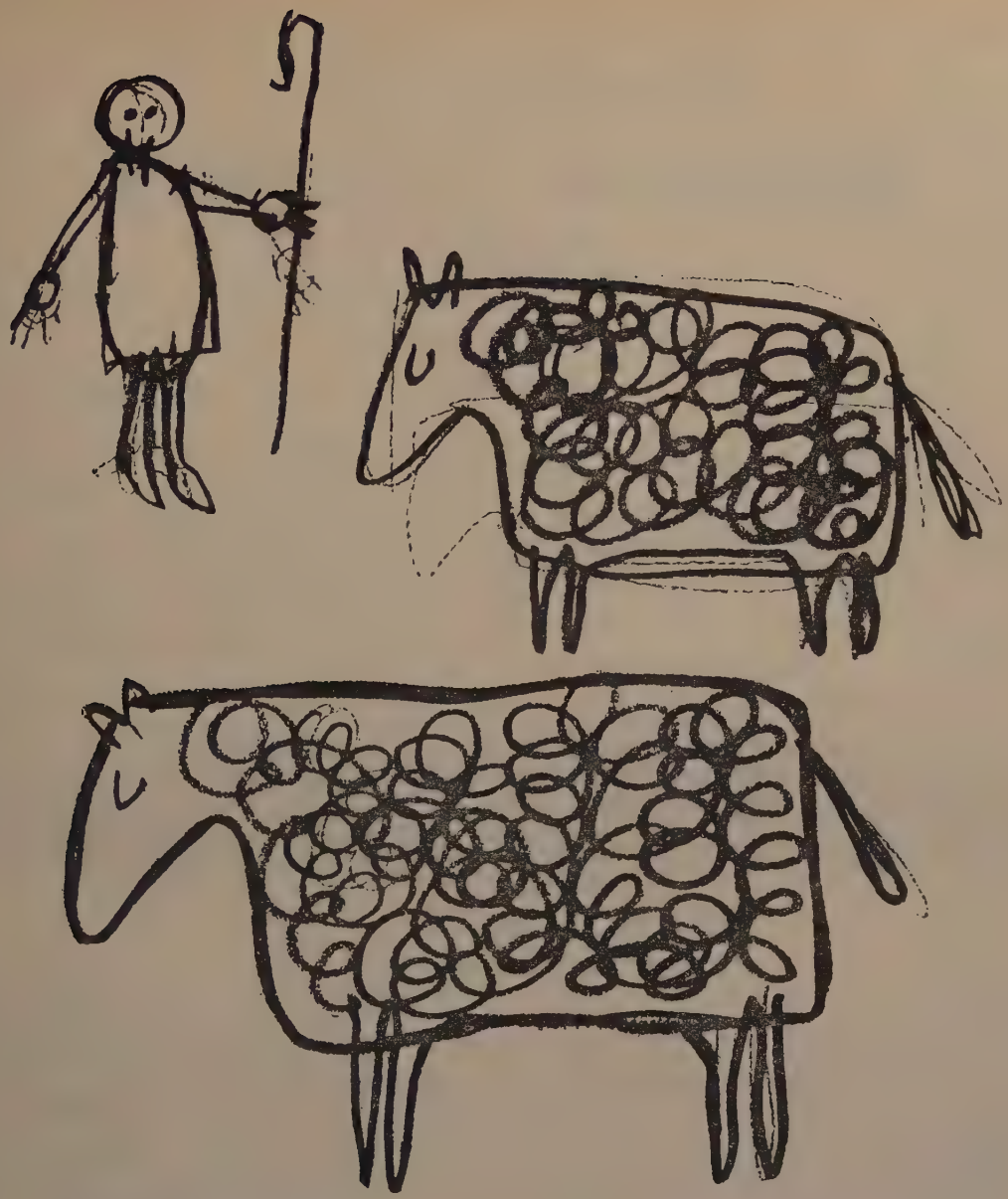
Westhues, M. & Fritsch, R. (1960). Die Narkose der Tiere. Band I. Lokalanästhesie. **[Narcosis of animals. Vol. I. Local anaesthesia.]** pp. 192. Berlin (& Hamburg): Paul Parey. DM 25.80. **979**

This is the first book on veterinary anaesthesia in the German language. A quarter of the book describes the action and uses of local anaesthetics and the rest is devoted to the techniques of infiltration anaesthesia, injection into joints and tendon sheaths, and nerve blocks. The great variety of nerve blocks, each described in detail, occupies half the book. Techniques are given for horse, ox and dog and there is reference to pigs in spinal anaesthesia and methods for castration, and to goats in anaesthesia of the horns. The 95 illustrations include many clear, original anatomical diagrams and photographs of injection technique. The bibliography covers eight pages. Volume II will deal with general anaesthesia and will be published soon.—R.M.

—. (1959). **International pharmacopoeia. First Edition: Supplement.** pp. xx+224. Geneva: World Health Organization. 25s. **980**

In this Pharmacopoeia the World Health Organization recommends standards of purity and strength for adoption by individual countries. Volume I was first published in 1951 and volume II in 1955. Both have now been reprinted to accompany the new Supplement. The whole work is also available in French and a Spanish edition is being prepared. Drug names are in Latin.—R.M.

Printed in Great Britain by CHARLES BURRELL & SON, Chertsey, Surrey.



Guarding the flock. Terramycin Injectable Solution has many applications, and can be administered in a variety of ways. It forms a standard part of most veterinary surgeons' equipment and is effective against a wide range of infections. Terramycin Injectable Solution is stable, sterile, ready for use and available in 40 ml. (2G.) and 100 ml. (5G.) vials.

Terramycin* *Injectable Solution*

BRAND OF OXYTETRACYCLINE

● *Intravenous* ● *Intramuscular* ● *Subcutaneous*

PFIZER LIMITED, SANDWICH, KENT

Pfizer

10040

* Trade Mark

VETERINARY INSURANCE SERVICES LIMITED

Directors
M. D. BERWYN-JONES, M.R.C.V.S.
R. J. HURST, F.C.I.B.
A. C. S. EAGLES

HOUSE PURCHASE PLAN

Veterinary Insurance Services have available ample funds, and can arrange advances of up to 95% of valuation on houses, maisonettes, or flats for owner occupation.

REPAYMENT PERIODS - UP TO 25 YEARS

INTEREST RATE - 6%

Veterinary Insurance Services transact all classes of insurances. If you would like details of the House Purchase plan or advice on any insurance matter, please complete and return the form below.

VETERINARY INSURANCE SERVICES LTD.

131-133, New London Road, Chelmsford, Essex.

I am interested in house purchase (a) *immediately* (b) *in the future*

Name ..... Date of Birth .....

Address ..... Wife's date of birth .....

..... Approx. value of property to

Tel. No. ..... be purchased .....

I also wish details of/advice on the under-noted type of insurance

.....

VB/4/61

CONTENTS

	Page
Diseases caused by Bacteria and Fungi	171
Diseases caused by Protozoan Parasites	187
Diseases caused by Viruses and Rickettsia	190
Immunity	199
Parasites in Relation to Disease [Arthropods]	201
Parasites in Relation to Disease [Helminths]	202
Spontaneous and Transmissible Neoplasms and Leucaemias [Including Fowl Paralysis]	208
Nutritional and Metabolic Disorders	209
Diseases, General	213
Poisons and Poisoning	219
Pharmacology and General Therapeutics	220
Physiology, Anatomy and Biochemistry	221
Public Health, Veterinary Services and Veterinary Education	225
Reproduction and Reproductive Disorders	226
Zootechny	228
Miscellaneous	229
Reports	229
Book Reviews	234
Books Received	235

Adler, J. H., 1295, 1296, 1297.
Agababyan, M. M., 989.
Aikat, B. K., 1055.
Ainsworth, G. C., page 235.
Allen, T. J., 1252.
Anderson, E. S., 1288.
Andreou, C., 1254.
Anghel, V., 1138.
Anthony, H. D., 1069.
Appleby, E. C., 1247.
Archer, R. K., 1269.
Aspiotis, N., 1254.
Assali, N. S., 1270.
Avery, R. J., 1302.
Awad, F. I., 1065.
Ayalon, N., 1296.
Azimov, S. A., 1164.

Babudieri, B., 1047.
Bachrach, H. L., 1095, 1099.
Bader, F., 1049.
Bain, R. V. S., 1013.
Bainborough, A. R., 1302.
Bale, W. F., 1194.
Bangău, S., 988, 1248.
Bankowski, R. A., 1140, 1145.
Barnes, E. M., 1288.
Barnett, S. F., 1086.
Barrett, A. M., 1153.
Bass, B., 1207.
Batchelor, A., 1259.
Bather, R., 1198.
Batten, J. C., 985.
Bauer, F., 1079.
Beauregard, M., 1199.
Bech, V., 1131.
Beerwerth, W., 1000.
Van Bekkum, J. G., 1093.
Bell, R. R., 1178.
Belyavin, G., 1126.
Bennett, G. H., 1088.
Berbinschi, C., 1019.
Berge, E., page 235.
Beverley, J. K. A., 1087, 1088.
Bhatia, B. B., 1162.
Bierer, B. W., 1061.
Blackmore, J. S., 1109.
Blackshaw, A. W., 1291.
Blazhevich, G. M., 1228.
Boca, R., 1248.
Bohlander, H. J., 1042.
Bolz, W., page 235.
Bond, V. P., 1239.
Boogaerdt, J., 1206.
Bool, P. H., 1085.
Borman, G., 1008.
Bouckaert, J. H., 1058, 1273, 1276.
Bourdier, P., 1226.
Bradley, D. E., 1041.
Brambell, M. R., 1171.
Braun, O. H., 1021.
Bridges, C. H., 1062.
Briggs, D. R., 1038.
Brion, A., 1129.
Brocklesby, D. W., 1086.
Brown, A., 1144.
Brown, M. L., 1189.
Brown, R. D., 1114.
Brownlee, A., 1275.
Brumfitt, W., 1020.
Brush, M. G., 1283.
Brutyan, A. S., 1237.
Buck, W. B., 1252.
von Buddenbrock, W., page 235.
Bugeac, T., 1019.
Bulanov, P. A., 1031.
Burt, H. H., 1029.
Burrows, R. B., 1168, 1181.
Butler, W. F., 1124.
Butură, I., 1248.
Buxton, A., 1018.

Callis, J. J., 1095.
Campbell, J. A., 1171, 1223.
Campbell, J. G., 1255.
Campbell, J. R., 1213.
Campbell, W. C., 1161.
Carlile, J. J., 1315.
Carll, W. T., 1061.
Casarett, G. W., 1194.
Catellani, G., 1068.
Cernea, I., 988.
Challey, J. R., 1083.
Chalmers, M. I., 1204.
Chappell, W. A., 1111.
Charles, J. A., 1308.
Chawla, L. R., 1154.
Cheah Phee Phay, 1011.
Chesley, L. C., 1270.
Churý, J., 1298.
Claeys, R., 1023.
Clapham, P., 1181.
Clark, L. G., 1045.
Clarke, R. T. J., 1059.
Clopton, J. R., 1211.
Coghlan, J. D., 1048.
Cole, C. R., 1090, 1193.
Combs, G. E., 1207.
Compagnucci, M., 1096.
Connell, R., 1199.
Coombs, R. R. A., 1153.
Copp, F. C., 1181.
Corsico, G., 1024.
Corstvet, R., 1140.
Couch, J. R., 1232.
Cronkite, E. P., 1239.
Cross, R. F., 1026.
Cuomo, P., 1192.

Dalton, R. G., 1017.
Darcel, C. le Q., 1198, 1199, 1302.
Davidson, I., 981.
Davis, A. D., 1119.
Davis, R. E., 1202.
Dekking, F., 1146.
Denton, D. A., 1210.
Desowitz, R. S., 1077.
Deutsch, K., 1197.
Dewey, M. E., 983.
Dhanda, M. R., 1136.
Dible, J. H., 1055.
Dickson, W. M., 1175.
Dineen, P., 985.
Dodd, D. C., 1176, 1203.
Dollahite, J. W., 1252.
Dorobanțu, R., 1007.
Douglas, S. D., 1271.
Dow, C., 1300.
Downey, N. E., 1209.
Downie, H. G., 1201, 1303.
Doyle, T. M., 1001.
Drăghici, C., 988.
Drăgusin, A., 1159.
Dumitrescu, A., 1019.
Dun, R. B., 1292, 1304.
Duncan, D. L., 1316.
Dunlap, J. S., 1175.
Dvořák, M., 1258.
Dyadechko, V. N., 1158.
Dyal, R. S., 1154.

Edwards, B. L., 1088.
Eggert, M. J., 1060.
Elam, C. J., 1202.
Elliot, J., 1275.
Ellis, W. W., 1250.
Ensminger, M. E., 1285.
Eppson, H. F., 1250.
Eshiet, N. E., 1285.
Espersen, G., 1242.
Ewert, A., 1170.

Fenje, P., 1103.
Fenner, F., 1106.
Ferguson, T. M., 1232.
Ferris, R. D., 1117.
Fesce, A., 987.
Field, A. C., 1171.
Fiennes, R. N. T.-W., 1215.
Fisher, E. W., 1017.
Folkes, B. F., 1315.
Fontaine, M., 1129.
Fox, L. E., 1184.
Franzke, H. J., page 235.
Fraser, A. F., 1305.
Fraser, R., 1280.
French, E. L., 1123.
Friedman, H., 1149.
Friedmann, J.-C., 1290.
Fromunda, V., 1159.
Fujita, T., 1216.
Fussgänger, R., 1079.

Gabel, A. A., 1284.
Gaby, W. I., 1149.
Gaidano, R., 1286.
Galton, M. M., 1046.
Galvin, T. J., 1178, 1179, 1180.
Gardiner, A. C., 1223.
Garside, J. S., 1288.
Gasparini, U., 1241.
Geiss, E., 1098.
Gemmer, H., 1190.
Gentile, G., 1241.
Gereš, V., 1246.
Germanyuk, Y. L., 1265.
Giacosa de Crescini, A. M., 1102.
Gilbert, C. S., 1250.
Gilbert, Y., 1116.
Gili, G., 1286.
Gillespie, J. G., 1130.
Girard, M., 1129.
Glenchur, H., 1038.
Glenn, M. W., 1250.
Gliński, Z., 1137.
Gloxhuber, C., 1166.
Goedbloed, E., 1085.
Gönnert, R., 1165, 1167.
Görner, F., 1107.
Golberg, L., 1259.
Golovatskii, I. D., 1266.
Goodhue, L. D., 1156.
Goodland, R. L., 1194.
Gordon, R. F., 1288.
Goret, P., 1129.
Gorman, G. W., 1046.
Goueffon, Y., 1116.
Gracey, J. F., 1249.
Graham-Jones, O., 1215.
Green, H. F., 1067.
Greig, W. A., 1213.
Grešíková, M., 1107.
Grigoryan, M. S., 1237.
Grillo Torrado, J. M., 1102.
Groulade, J., 1225.
Groulade, P., 1091, 1225.
Grumbles, L. C., 1015.
Guinée, P. A. M., 1023.
Gutierrez, J., 1202.
Gylstorff, I., 1224.

Hafez, E. S. E., 1285.
Halík, J., 996.
Hall, W. H., 1038.
Halliday, R., 1147.
Handford, S. W., 1238.
Harding, J. D. J., 1088.
Harold, L. C., 1261.
Harris, A. H., 1003, 1244.
Harrison, H. N., 1278.
Harrison, M., 1280.
Harvey, W. R., 991.
Hauser, H., 1063.
Havránek, I., 1107.
Hawker, L. E., 1315.
Hawking, F., 1078.
Hay, J., 1039.
Hayakawa, T., 1113.
Hazard, E. C., 983.
Hecht, G., 1166.
Heinig, A., 1094.
Heirman, A. L., 1042.
Heller, L. A., 1132.
Henderson, W., 1026.
Henricson, B., 1282.
Henson, J. B., 1015.
Heptinstall, R. H., 1020.
Hess, W. R., 1095.
Hilding, A. C., 1279.
Hill, C. R., 1236.
Hill, K. J., 1277.
Hintinaus, J., 1120.
Hinton, N. A., 984.
Hobbs, B. C., 1288.
Hoeksema, T. D., 1303.
Holden, P., 1109.
Holec, J., 1016.
Hollister, C. J., 1045.
Holm, L. W., 1270.
Hosoda, T., 1151.
Howarth, J. A., 1121, 1122.
Howe, C., 1108.
Hoyt, H. H., 1050, 1057.
Hummer, W. K., 983.
Hunt, G. R., 1168.
Hurlbut, H. S., 1112.

Ikegami, T., 1134.
Illés, J., 993.
Illing, K., 1262.
Impi Aho, 1281.
Inglis, J. S. S., 1017.
Ingram, P. L., 1017.
Inoue, K., 1216.
Ionov, P. S., 1200.
Ishii, S., 1089.
Ishitani, R., 1127.
Itikawa, O., 1113, 1233.
Ivanov, V. P., 1228.

Jarrett, W. F. H., 1183.
Jarvis, C., page 235.
Jean-Blain, M., 1010.
Jennings, F. W., 1183.
Jitaru, G., 1248.
Johnson, W. P., 1155.
Jones, B. V., 1183.
Joubert, L., 1010.
Justice, W. H., 1043.

Kadyrov, G. K., 1268.
Kaneko, T., 1151.
Katitch, R. V., 1052.
Katz, Y. J., 1270.
Kauffmann, F., 1021.
Kay, D., 1041.
Keidel, H. J. W., 1085.
Kekwick, R. A., 1147.
Kelley, D. C., 1069.
Kennedy, P. C., 1121.
Kenny, J. E., 1174.
Khairy, M., 1240.
Kharina, N. P., 1030.
Khatin, M. G., 1158.
Klimeš, B., 1258.
Know, K. W., 1013.
Knowles, J. R., 1072.
Kobusiewicz, T., 1100.
Koestner, A., 1090.
van Koetsveld, E. E., 1206.
Koga, O., 1287.
Konaté, I., 1074.
Konishi, S., 1134.
Koppel, Z., 1142.
Koštanský, K., 1229.
Kostyra, J., 1186.
Kovalenko, J. R., 1051.
Krause, W., 1262.
Kresse, J. I., 1045.
Kudělka, E., 1016.

Lambert, H. P., 986.
Langford, E. V., 1199.
Lannek, N., 1218.
Lansade, P., 1125.
Lanzkowsky, P., 1293.
Larsen, A. B., 991.
Lauridsen, O., 1071.
Lavender, A. R., 1281.
Lavrentiades, G., 1254.
Lawrence, W. A., 1263.
Lawson, D. F., 1318.
Lebon, E., 1004.
Legault-Démare, J., 1299.
Leger, P., 1220.
Legrand, P., 1129.
Leistner, W., 1036.
Lennette, E. H., 1133.
Levaditi, J. C., 1091.
Levine, N. D., 1081.
Lewis, G., 1213.
Lindberg, P., 1218.
Linton, A. H., 1315.
Lissot, M. G., 1141.
Littlejohn, A. I., 1213.
Lodge, G. A., 1316.
Loosli, J. K., 1278.
Lovell, R., 1017.
Lüderitz, O., 1021.
Lungu, V., 1159.

Maag, D. D., 1211.
McCall, J. T., 1207.
McClenaghan, R. J., 1104.
McCune, R., 985.
McIntyre, W. I. M., 1017, 1183.
MacKay, J. M. K., 1223.
McKercher, D. G., 1122.
MacLeod, A. J., 1135.
MacOwan, K. D. S., 1311.
McTaggart, H. S., 1217.
Maltman, J. R., 984.
Manninger, R., 1054.

Margalith, M., 1033.
Markenson, J., 1033.
Markson, L. M., 1243.
Marolt, J., 1187.
Marsden, E., 1234.
Marshak, R. R., 1045.
Martin, L. E., 1259.
Mastronardi, M., 1064.
Matsuo, T., 1287.
Matthias, D., 1118.
Mauléon, P., 1299.
Maw, G. A., 1317.
May, I., 1143.
Mayhew, R. L., 1177.
Mayneord, W. V., 1235.
Mémery, G., 1073.
Michaels, L., 1020.
Michaelson, S. M., 1194.
Międzobrodzki, K., 1253.
Mihajlović, B., 990.
Mihich, E., 1195.
Miller, G. C., 1177.
Miller, R. M., 1230.
Millican, R. C., 1014.
Miniovich, F. L., 1044.
Missioux, L. M., 1260.
Mlinac, F., 1022.
Mogi, K., 1151.
Mohan, R. N., 1081.
Moll, T., 1119.
Montemurro, N., 1064.
Montgomerie, R. F., 1223.
Moodie, E. W., 1213.
Moore, N. W., 1150.
Moore, T., 1214.
Morehouse, G. L., 1026.
Morgan, C., 1108.
Morgan, W. J. Brinley, 1041.
Mornet, P., 1116.
Morrant, A. J., 1292.
Morris, D., page 235.
Mortelmans, J., 1023.
Mount, L. E., 1267.
Movsesyan, T. B., 1009.
Moynihan, W. A., 1221.
Mozgov, I. E., 1289.
Mulligan, W., 1183.
Munday, B. L., 1002.
Mustard, J. F., 1201, 1303.
Myakushina, A. A., 1031.

Nardi, E., 1169.
Nauryzbaev, E. N., 1031.
Negretti, F., 987.
Nelson, A. M. R., 1183.
Nemeséri, L., 1257.
Newberne, P. M., 1205.
Newling, P. E., 1203.
Nichol, C. A., 1195.
Nielsen, S. W., 1193.
Niilo, L., 1198, 1199, 1302.
Nilakantan, P. R., 1136.
Nilsson, G., 1218.
Nobuto, K., 1089.
Nordström, G., 1218.
Norval, J., 1048.
Novák, Z., 1006.
Nový, J., 1251.

Ochi, Y., 1134.
O'Dell, B. L., 1205.
Officer, J. E., 1144.
Ogilvie, J. M., 1204.
Okaniwa, A., 1127.
Olander, H. J., 1121.
Olitzki, A. L., 1033, 1040.
Olson, C., 1008.
Olson, L. J., 1170.
Omuro, M., 1089.
Orlandella, V., 1012.
Orr, J. H., 984.
Orsborn, J. S., 1211.
Orstadius, K., 1218.
Orue, J., 1073.
Oudar, J., 1010.
Oyaert, W., 1273, 1276.

Page, L. A., 1145.
Pande, B. P., 1162.
Papadopol, M., 1138.
Papp, E., 1284.
Parish, W. E., 1153.
Parker, H. R., 1270.
Parker, W. H., 1183.
Păunescu, G., 1152.
Payne, J. M., 1035, 1126.
Peacock, R., 1183.
Perman, V., 1239.
Perova, K. S., 1044.
Philippo, W., 1140.
Pilet, C., 1129.
Plowright, W., 1117.
Pogonyailo, G. F., 1128.
Polony, R., 1142.
Polukhin, F. S., 1219.
Pool, W. A., page 235.
Popesko, P., page 235.
Popovici, V., 1143.
Possi, L., 1294.
Poynter, D., 1183.
Prat, J., 1227.
Precup, O., 1248.
Prier, J. E., 1105.
Prokůpek, K., 992.
Pullman, T. N., 1281.

Radley, J. M., 1235.
Raethel, H. S., 1188.
Raggi, L. G., 1139.
Rajtar, V., 1006.
Rankin, J. D., 997.
Rapić, S., 1246.
Rasmussen, H., 1281.
Rawes, D. A., 1181.
Reeves, J. C., 1288.
Reháček, J., 1110.
Richter, S., 1182.
Rigdon, R. H., 1232.
Ritchie, J., 1222.
Robinson, G. A., 1303.
Robinson, J., 1183.
Röhrer, H., 1094.
Rogers, W. P., 1172.
Romanoff, A. L., page 235.
Romberg, P. F., 1060.
Rose, H. M., 1108.
Rothstein, N., 1189.
Rowell, J. G., 1267.
Rowsell, H. C., 1201, 1303.
Rowson, L. E. A., 1150.
Rubin, R., 1185.
Ruckebusch, Y., 1010.
Rust, J. D., 1014.

Sabatier, H., 1141.
Sabine, J. R., 1210.
Sadler, W. W., 1037.
Said, A. H., 1058.
Sakkubai, P. R., 1136.
Salenstedt, C. R., 1132.
Sander, E. G., 1278.
de Santiago y Redel, E., 1075.
Saphon, 1004.
Sasu, E., 1138.
Sauer, R. M., 1105.
Saunders, C. N., 1244.
Savage, J. E., 1205.
Schaaf, J., 1000.
Schmahlsteig, R., 982.
Schmitt, J., 1190.
Schraufstätter, E., 1165.
Schützler, G., page 235.
Scott, G. R., 1114, 1117.
Scratcherd, T., 1301.
Segre, D., 1008.
Sellers, A. F., 1274.
Sen, A. B., 1078.
Setka, R., 1120.
Sewell, I. A., 1272.
Sharma, R. M., 1154.
Sharman, I. M., 1214.
Sharp, N. C. C., 1183.
Shaw, I. G., 1088.
Shibata, T., 1113.
Shotts, E. B., Jr., 1046.
Shrimpton, D. H., 1288.
Shuman, R. D., 1005.
Sieburth, J. M., 1025.
Siegmann, O., 1082.
Siller, W. G., 1197, 1247.
Silverman, P. H., 1183.
Sirbu, Z., 1152, 1248.
Smith, H. Williams, 999, 1017.
Smith, I. M., 983.
Smith, W., 1223.
Smollich, A., page 235.
Soave, O. A., 1133.
Sobrero, R., 1163.
Solomon, G. C., 1109.
Sommerville, R. I., 1172.
Soprunov, F. F., 1173.
Sorel, P., 1225.
Sorensen, D. K., 1239.
Spar, I. L., 1194.
Spence, J. B., 1244.
Spooner, E. T. C., 1066.
Stamatović, S., 1196.
Stamp, J. T., 1223.
Standen, O. D., 1181.
Stansbury, R. E., 1156.
Stevens, A. J., 1244.
Stevens, C. E., 1274.
Stierlin, H., 1021.
Stoican, E., 1159.
Stojković, M., 990.
Stone, S. S., 1115.
Storz, J., 1122.
Straub, O. C., 1122.
Strohmaier, K., 1098.
Strufe, R., 1167.
Stuart, E. E., 1084.
Suarez-Soto, M., 1299.
Sugiura, K., 1160.
Suzuki, K., 1089.
Swanson, L. E., 1184.
Széky, A., 1257.
Szemberowa, M., 1137.

Taga, L., 1138.
Takatori, I., 1134.
Tamarin, R., 998.
Taylor, W., 1301.
Tendetnik, Y. Y., 1173.
Tepper, I., 1101.
Terlecki, S., 1243.
Terry, R. J., 1183.
Teryukhanov, A. B., 1128.
Thomas, J. B., 1061.
Thomas, J. I., 1112.
Thomlinson, J. R., 1018.
Thomson, A., 1053.
Thonn, S., 1004.
Thorne, A. L. C., 1135.
Tillotson, A. J., 1185.
Todd, J. R., 1249.
Tomeoka, N., 1134.
Torbert, B. J., 1177.
Toscano, G., 1286.
La Touche, C. J., 1070.
Trainin, D., 1295, 1297.
Trenchi, H., 1256.
Triau, R., 1004.
Trunkát, J., 1229.
Tsirel'son, N. B., 1200.
Turk, R. D., 1178, 1179, 1180.
Turner, R. C., 1235.

Ullberg, S., 1282.
Urbaschek, B., 1032.
Urquhart, G. M., 1183.
Usui, K., 1216.

Valentine, H. D., 1061.
Vallée, A., 1091.
Vallely, T. H., 1183.
Vardaman, T. H., 991.
Varfolomeyeva, A. A., 1044.
Veckenstedt, A., 1097.
Venturoli, M., 1241.
Vice, T. E., 1263.
Vickers, C. L., 1061.
Vidler, B. O., 1086.
Vrtiak, J., 1142.
Vukelić, E., 1187, 1246.

Wade, A. E., 1184.
Waheed Ahmed, 1292.
Walker, C. A., 1264.
Walker, J., 1066.
Wallace, H. D., 1207.
Walley, J. K., 1183.
Warner, R. G., 1278.
Watson, W. A., 1087.
Watt, J. A. A., 1223.
Weinman, D., 1092.
Westerlund, A., 1208.
Westhues, M., page 235.
Westphal, O., 1021.
Willis, A. T., 1056.
Wilson, A. P., 983.
Wolff, J. W., 1042.
Woodroofe, G. M., 1106.
Woodworth, H. C., 1092.
Wright, W. W., 1261.
Wupper, O., 1029.

Young, L., 1317.

Zemjanis, R., 1050, 1057.
Ješkov, B., 1187.
Zinca, S., 1138.
Zinneman, H. H., 1038.
Zuffa, A., 1006.
Žuković, M., 1187.
De Zulian, V., 987.

BICENTENARY OF THE NATIONAL VETERINARY SCHOOL OF LYON

The National Veterinary School of Lyon (France), the oldest veterinary school in the world, was founded in 1762 by Claude Bourgelat, farrier to King Louis XVth. The bicentenary of its foundation will be commemorated on 26th and 27th May 1962 at Lyon, France.

as a prophylactic after parturition

also in White Scours, Pneumonia, Shipping Fever, Enteritis and Metritis.

CHLOROMYCETIN VETRETTES

tablet form of Chloromycetin*

Administration: As a uterine pessary: Orally as a tablet or crushed in milk and water and used as a drench.

Box of 6 Vetrettes,* each containing 500 mg. chloramphenicol.

* TRADE MARK

WPS-1121

PARKE-DAVIS

PARKE, DAVIS & COMPANY. Inc. USA Liability Limited
Hounslow, Middlesex. Tel: HOUnslow 2361